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Mo. Bot. Garden.
QK371.4 .H59 1816

Essay on the Geography, Minoralogy and Botany of the Western portion of the Territory of the Native Princes of Java.

ADDRESSED TO THE HONORABLE

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SECTION I.

The following Essay contains the substance of the Geographical, M neralogical and Botanical remarks made during a journey through the Western portion of the territory of the Native Princes of Java. It is not necessary for the present purpose to define with accuracy the extent of this territory: it is bounded in the West, the North and the East by the Honorable East India Company's possessions, and in the South by the Ocean. The two Princes are generally known by the titles of the Susuhunan and the Sultan: the capital of residence of the former is called *Surokerto* of the latter *Jokjokerto*; the principal subdivisions of that part of the Island which is occupied by their dominions, will be mentioned in the next section: the territory is divided between both, and in the division a principal object has been to allot to each an equal extent of ground and the same revenue.

I have premised, to the detail of the remarks on the subjects above mentioned, an extract of the journal kept during my route, for the purpose chiefly of elucidating the geographical descriptions: this will form the first section: the second comprizes the geographical remarks, the third those on mineralogy, and the fourth those on botany. I left Surakarta on the first of August.

August 2.—The road from Surakarta to Jokjokarta pervades the most cultivated portion of the antient Mattaram; the tract is, on the whole, level; after a small eminence near the remains of deserted Kartasura, it passes, into the declivities of the mountain Marapi, which is observed, nearly in a North-west direction, at the distance of about twelve miles. Strangers uniformly admire the surrounding scenery. The prospect is extensive and large: the uniformity of a country in a high state of cultivation is diversified by the huge cone of the Marapi, towards which the territory gradually rises, and by an extensive range of low hills which appear to meet the road in a Western direction. Numerous rivers and rivulets descending from the large mountain, cross the road: their current is rapid, and in their basins are found almost exclusively volcanic materials. They frequently swell after raine, so suddenly as to become dangerous to travellers; most of them are checked by the Southern hills, and being consequently diverted to the Eastward, fall into the large river of Solo: one principal stream only takes a direction Westward of the range of hills, and discharges itself into the Southern Ocean at Manchingan.

Beyond Jokjokarta the large road inclines more to the South, and gradually approaches the shore: I halted successively at *Bantul*, *Brossot* and *Kadilangu*, at each of which places a Chinese Collector of the Customs resides. European travellers through this part of the Island take their abode, almost necessarily, with these people, where they are, in most cases, received with hospitality. By the frequent travelling of persons on public business, through this part of the Island, Chinese inhabitants are in some degree accustomed to our habits, and it must be acknowledged that they cheerfully contribute what is in their power, to the comfort and convenience of travellers. The first thing which is presented to a stranger on his arrival is *tea*, which according to the custom of the Chinese is found in readiness at all hours of the day in their dwellings, even in the most distant parts of the Island: and from the quality of this article some estimate may usually be formed of the condition of the inhabitants. About the time of their ordinary meals, the traveller is always liberally supplied with the common food which serves for the family, but those articles of convenience and luxury to which Europeans are accustomed must be provided by himself: in exchange for the comfort or assistance he receives, he must generally submit to an interrogation from all the inhabitants of a dwelling; and these are often importunate and troublesome: The object of his journey is minutely enquired into, his baggage is reviewed with a curious attention, and every novel or uncommon object becomes the subject of particular disquisition;

if the traveller is a man of rank, his attendants and servants must expect to be interrogated and examined in his place.

On entering the compound of the Farmer of the Customs at Bantul, I observed about half a dozen large game-cocks under appropriate cages, whose constant clamour and cackling appeared te be pleasant and agreable to all the inhabitants of the house in the same degree in which it was annoying to me: I soon perceived that they were objects of particular attention and carefully fed at regular periods. Every person accustomed to the intercourse with the natives, whether in the interior or along the seacoast, knows that cock-fighting is one of their common diversions, and even where these animals are not kept for this purpose, several large cocks under spacious cages or rather baskets are constantly found arranged at certain distances around their compounds. It is probable that the Chinese have adopted this amusement from the Javanese, but I afterwards found it universal among them on the route though this part of the Island. In the vicinity of the capitals, the Chinese Farmers follow the mode of life of their inhabitants, and the dwellings are supplied with various articles of house-hold furniture, but in the distant farms, chairs and even tables are generally looked for in vain.

The dwelling of the former at Bantul, indicated some taste and neatness; being a native of the Island, of Chinese descent he has like many others of this description (who are denominated *peranakans*) imitated the customs and mode of life of Europeans. At Brossot a lodging-house, *passangrahan*—is provided for the

convenience of the traveller at some distanee from the dwelling of the farmer; it is in a pleasant situation, cleanly, and supplied with the various necessary articles of furniture, but at *Kadilangu* he must accomodate to the inconvenience and offence of a bambu shed, crowded with numerous Chinese inhabitants.

August 5.—At Kadilangu I left the common route along the southern shore, and proceeded in a north-western direction towards the interior; I crossed the large river of Bogo-wonto several miles above its discharge. A branch of the grand ranges of central Hills, here extends considerably to the south, and the river often winds near the foot of the most projecting points. I breakfasted at *Bubutan*, a small farm belonging to Kadilangu, and passed a Bazar, called *Jénnér* about 10 o'clock. Here I observed the principal points of the branches of Hills descending in this direction, to which the road very gradually approaches, on the route to Jonno, where I arrived about 2 o'clock.

Jonno is the most considerable mart for the various linens which are manufactured in considerable abundance in this part of Baggalen, and well known in the surrounding districts on account of the quantities which are here offered for sale at certain days in the week. The whole of this province is celebrated for its manufactery of Cotton; wherever the soil is favorable this article is cultivated, but much more is required than the country produces, and the dificiency is supplied by the neighbouring province of Banyu-mas. On my further route I frequently met transports of Cotton proceeding to the Bazar of Jonno. The trade in this ar-

ticle, whether raw or manufactured, is chiefly engrossed by the Chinese; and a number of them have permanent residencies at this and the neighbouring Bazars: Several of their dwellings at Jonno are built of brick, and resemble those of the more wealthy inhabitants at the capitals.

A branch of the river Bogo-wonto, the river *Jali*, passes through this Bazar, and during the rainy season the whole surrounding territory is completely inundated: the intercourse with the neighbouring villages is now carried on exclusively in small Prows or Canoes, and affords on Bazar days, a very pleasant and lively scene.

August 6.—Went on to *Weddî*, a considerable village and Bazar at the western extremity of Baggallén. About half way (from Jonno) the village of *Gebbang* is situated on a river of the same name, in the vicinity of which numerous plantations of Cotton are laid out; the course from Jonno to Weddî is nearly directly west. Between Gebbang and Weddî I met numerous traders returning to the capital with the linens purchased at the bazar of this day.

Weddì is, next to Jonno, the most considerable mart for linens in this Province; it belongs to Surakarta, while the former is attached to Jokjokarta. I observed during a walk in the afternoon, many of the female inhabitants carrying loads of red yarn, elegantly colored of a deep scarlet. It was brought to the farmer of the Customs for the stamp or licence required to offer it for sale at the bazar. This yarn is died by the Morinda Citrifolia, the *Bengkudu* of the Javanese, or by a distinct species of this genus which is cultivated as an under-shrub.

August 7.—On leaving Weddi I took again a southern course towards the road leading from the capital to Karang-bollong. After crossing the river of *Lerreng*, which at this time of the year is small and confined, but in the rainy season contributes principally to the inundation of the surrounding territory, I arrived at *Ngambal*, a small village and tract near the large road, and further westward observed *Banjur*, *Botshor*, and several other large villages. About noon I reached *Bedati*, a small farm, a dependency of Weddi.

August 8.—I proceeded on the large road, to *Patanaän*, and consequently to *Kaleng* and *Wetton*: the tract is nearly level, but on leaving Wetton one observes distinctly the transverse ranges of hills which contribute to form the peninsula projecting in this part of the Island. About noon I arrived at the river *Chiching-goleng*, which winds at the foot of the hills, and at the extremity, a few hundred yards South from the road, discharges itself into the Ocean. Several small villages are dispersed through the neighbourhood, the inhabitants of which assist the traveller in crossing: the river is very eep and the sea beating in from the south, occasons at times considerable roughness; two or three small canoes are attached to each other by means of a raft of plaited bambu, on which the passengers and goods are conveyed across. On the opposite side the ascent is at once precipitous, and the constitution of the hill is found entirely different from the low tract through which the road has hitherto passed. After the first ascent and an oblique curve of about half a mile along the western slopes of the first ridge, one meets

in a valley, transmitting a small rivulet, the principal village on this peninsula, denominated *Karang-bollong*. From Surakarta to the river Chiching-goleng, the road passes, with few exceptions, through districts which are cultivated: a great proportion of these are low, and rice raised on inundated grounds, (*Padi-sawa*,) is the chief production. In some parts of Baggalen this grain is sowed on high grounds, elevated beyond the point that is inundated during the period of the rains, and in rotation with various other vegetables which are employed in the food of the natives: these are principally *Legumes* of various kinds, *Cucumbers* and other cucurbitaceous plants—*Roots* (Dioscoreæ, Convolvuli, &c.) and many others. Favourable situations produce *Kachang-china* (Arachis Hypogaea) Indian-corn and Cotton. But in many of the fields which I observed the soil is composed almost purely of clay, without any mixture of sand or mould, bursting widely during the hot season, and only accommodated to the production of one crop of rice, on the retirement of the inundation caused by the rains.

August. 9.—Was devoted to the examination of the hills in the neighbourhood, and to a visit to the caverns in which the Hirundo Esculenta builds her nests. These caverns are found, at intervals, along the whole of the southern coast, from Java Head to the extreme eastern point, but no part of the Island contains them of the same extent or so well supplied with inhabitants, the circumstance on which their productiveness depends. The object of my visit was to determine personally their mineralogical constitution, as my ideas had hitherto been formed alone

from the analogy of similar caverns in other parts of the Island, in which they are formed almost exclusively in calcareous rock; and it will be necessary, consequently, to modify a remark made in the first part of the mineralogical essay. In regard to the particular economy of this bird, his food, and the manner of constructing the Edible Nests, as well as substance which furnishes the mateials, much remains still to be ascertained.

The peninsula which here projects to the south beyond the common range of the coast in this part, consists of several successive ridges running parrallel, almost directly north and south, and terminating precipitously at the Ocean. At the extremity they are divided by numerous clefts or fissures, which penetrate into the body of the hills, and in many instances extend, with various windings, to a considerable distance. Their direction in general is vertical, the horizontal diameter being the smallest, and they are closed above by the same mineral substance which forms the body of the hill Many of these fissures are in contact with the Ocean, the water of which occupies the lower portions: in these cases the external openings have remained complete, while in more inland situations, the hills of which we may analogically suppose to be cleft in the same manner, the apertures have been closed by de-composing vegetables or minerals, and the fissures to which they lead are concealed.

The apertures of those caverns which are at he present period most productive in Bird's Nests, are situated at the bottom of precipices whose perpendicular height is between 50 and 100 fathoms: they are narrow, and have the

same vertical disposition as the caverns; the water of the Ocean enters and retires with the tide, beating violently against the rocks which compose them, and at certain periods, when the waters rise above the common standard, the access to the caverns, always difficult and dangerous, is entirely impracticable. When this occurs during the period of collecting the Nests, it proves a great annoyance to the natives who are employed in this business.

The collection of the Bired's Nests being a very hazardous office, is effected by the inhabitants of neighbouring hills, who are accustomed to it from their infancy. They are denominated *Tukans*, the general term, in Malay, of a person expert in any particular business, or exercising a profession. The descent to the external aperture is performed on a ladder of Rattan, resembling in some degree the Shronds of a ship, attached to a rock, tree, or other fixed substance from which it depends perpendicularly. Although the length is in several instances very considerable, the descent and the return, even to a person carrying a load, is considered a trifling enterprize in comparison with the gathering of the nests from the sides of a cave: for this purpose bridges, often of considerable length, are constructed of the entire runks of Bambu, which are placed together longitudinally and transversely, and fastened to each other by rattans; a support to the hand of the collector is afforded by a separate rattan, of a large size, extended parallel to the bridge, about half a man's height, and answering to the railing commonly employed as a support across a narrow or difficult passage. These bridges are attached

to the projecting Stones of the Cavern, and their judicious regulation and distribution is one of the most important and hazardous duties of the office of a Tukan. If a collector misses his hold, or if the bridge which he traverses separates or breaks, he is inevitably lost. No exertion of his fellows can save him; if in his fall he should escape the sides of the cave, the violent agitation of the ocean at the bottom would infallibly dash him against the rocks.

Having visited the Caverns in the immediate vicinity of Karang-bollong, I pursued my course in a Western direction, across the successive ranges of hills, to the south-west extremity of this peninsula: at the cavern of Nagassary the declivity was sufficiently gentle to enable me to descend to the bottom, to observe the external aperture distinctly, and to examine at leisure in contact with the ocean, the materials that compose the extremity of the hill. A large vertical section was here exposed, and exhibited very strikingly the disposition of the strata which I had previously traced at the surface. At certain periods, when the ocean in not much agitated, it is not difficult to descend to the entrance, from this pile of rocks where I observed it, which is descriptively by, the Javanese, the *Pagelaran* or outer-apartment of the cavern. The particular constitution of the rocks will be described in the Mineralogical account.

After a visit to *Jingkla*, I descended on the Western side of the Peninsula, into the plain near the Eastern boundary of the district of *Aya* A small Chinese Farm called *Jittis* is situated here, and a few inconsiderable villages are

dispersed. The rest of Aya, in this part, is a desert, overflowed during the rains, marshy at all periods, and rendered almost inaccessible by an excessive luxuriance of an useless and unprofitable vegetation. At the foot of the ridges a considerable river, called the *river of Aya*, discharges itself into the ocean, near which, about five miles inland, the village of *Pringtuttul* is situated, well known as the place of banishment of offenders or rank from the court of Surakarta, and particularly of such as have incurred the displeasure of the Sovereign, by real or supposed treasonable conduct. This village is situated in a large forest, surrounded by marshes, and in a high degree solitary and gloomy. I observed in the Inhabitants of the neighbouring district a mode of dress, which is not common in the more populous or polished districts: in place of the common habit or vestment, consisting of a broad strip of Linen, denominated *Sarong* or Long-cloth by the Malays they wrap a similar strip of Strawsack or *Karong* about their Loins, which gives them a disgusting and savage appearance, and their manners appeared to partake in some degree of the apparent ferocity of their dress. The carried on their conversation with an uncommon vociferation; but they deserve consideration both on account of the wildness of the district which they inhabit, and of the dangers and hazards to which those are exposed who inhabit the Hills and assist in collecting the produce of the caverns. They have a particular method of carrying their common iron utensils or hatchets, used in cutting trees and for various domestic purposes; these they place

in a square wooden sheath or rather box, suspended by a girth at the lower part of their backs, which produces a rattling noise in walking and moving; on the sculpture of this box they display the utmost of their skill; in several instances the fragments of a broken looking glass were employed to increase its beauty.

After my return to Karang-Bollong I visited several of the chief villages of this neighbourhood; they are in general small and dispersed through the Hills: they have no (or very confined) Rice-gronds, but are plentifully supplied with Cacoa-nut and other Fruit trees. The common domestic animals which serve for the food of the natives, Goats, Fowls, Ducks &c. are very cheap, and rice is abundantly supplied by the neighbouring districts of Baggalen. The name of Karang-Bollong is derived from an excavation or vault in the extremity of the hill, near the discharge of the river Chichinggoleng; this is mentioned in the subsequent sections. Abouth two miles Westward of the chief village, the ridges are intersected, at the ocean, by a considerable bay, denominated the Bay of Passir, near which *Wollo* and various other small villages are pleasantly situated.

Agust 14.—I continued my route directly north along the ridges which constitute this peninsula; I halted at *Rangka*, a small district belonging to Baggalen, completely level and covered with villages and rice-gronds.

Agust 15.—I made a diversion from the common road, and visited the principal village of the district of Roma, called *Jati-negara:* the tract is level and in a high state of culture, but not far to the northward the summits of the cen-

tral ranges are discerned. Hence I took a western course to Selondokko, a village near the northern confines of the district of Aya. Several miles beyond Jati-nogoro the road meets the hills descending from the numerous central ranges, and the environs of Selondokko are already very uneven and separated by a succession of ranges, gradually rising to the north, from the lower district of Aya, in which Pring tuttul and Doplang are, in a southern and southwestern direction, solitary hamlets. Through the neighbouring hills of Selondokko numerous small villages are dispersed, the inhabitants of which cultivate "*Gogos*" or mountain rice. The soil is a black mould and highly prolific. The improvement of this neighbourhood is progressive, and the population gradually increases.

August 16.—On the further route the unevenness of the territory increases; after passing several rivulets which take a southern course, I arrived at the foot of the hill *Chelenan*, the ascent of which is long and considerable: on the summit a fine prospect of the surrounding country is afforded; I noticed the direction of Pring-tuttul and Jittis, and the south-west extremity of the peninsula of Karang-bollong: according to the usual custom, a simple break-fast was here provided, in the native style, for our party, by the inhabitants of the surrounding villages, under the shade of several ancient Warringin trees, which afford a convenient and pleasant resting place to travellers; and the long-continued ascent, from both sides of the hill, renders the situation peculiarly desirable as a place of refreshment. The descent in the north is interrupted by repeated ravines; having passed

several, a wide prospect opens in the north: an extensive portion of the grand central valley displays the windings of the river Serayu, beyond which the ranges in the north are observed to rise towards the large Mountain of Tagal: as one proceeds in the descent, the situation of the capital of Banyu-mas is distinguished by a close forest of Cacoa-nut trees. — I arrived here about 12 o'clock.

In the immediate environs of the capital a considerable tract is appropriated to the support of the Tommong-gong or native governor of this province, while the greatest part of the revenue of the principal sub-divisions, which are mentioned in the next section, are yielded to the Sovereign. The share of the Tommong-gong amounts to about one-fift of the whole proceeds of the province; besides this each of the divisions has a particular native chief, who administers his respective district, but is subordinatie to the Tommong gong.

The capital of Banyu-mas is situated on the banks of the river Serayu, being regularly laid out and divided by broad roads, crossing each other at right angles, and bounded by a high fence of bambu, beyond which the dwellings of the inhabitants are disposed without order; each family has a particular allotment of ground or square which generally is surrounded by a separate enclosure. The dwellings of the Manteries and other principal inhabitants are only distinguished by the external gateway, being more conspicuous, and, in some cases, ornamented with rude sculpture. I could obtain no satisfactory information as to the number of inhabitants of th capital, or rather principal village; no accurate

enumeration has yet been made; according to a vague estimate it contains between 3 and 4000 Souls. The Chinese inhabitants live separately on the banks of the river, near the farmer of the customs. The name of the village and the whole province is said to be derived from a small rivulet, which pervades the southern portion, and unites to the Serayu near the part inhabited by the Chinese, denominated from time immemorial Kali or *Banyu-mas.*

August 20.—I left the chief village to visit the South-western districts of this province: my course was first in a southern direction. After passing the narrow plain which bounds the banks of the river, and is laid out into rice plantations, I crossed a branch of the central hills running off in a South-western direction, consisting of numerous smaller points aggregately called the hill of *Kali-weddi*.

This range, as well as that between Selondokko and the capital is covered with a luxuriant vegetation, differing from the wilderneess of the lower tracts; it furnished me with various new subjects which will be mentioned in a succeeding section. It likewise afforded an excellent opportunity of noting the gradual succession of various vegetables according to the point of elevation. At one of the southern declivities of the separate hills, almost the whole of the district of Aya was exhibited to view. The extent of coast from the peninsula of Karang-bollong to the hill Bedu-gangan was distinctly seen; the surf beating against the shore, appeared like a white band, and formed a highly pleasing spectacle. On leaving the range of Kali-weddi, one descends into the plain of Aya, which in this part is

not subject to long continued inundations and affords many situations fit for culture. I met with several villages near the banks of the Serayu, the curves of which often meet the road. I arrived at *Maos* at 2 o'clock P. M. here the state of cultivation grandually increases. *Penggalan*, whither I proceeded the next morning, is likewise a flourishing village, and the environs of *Adipollo*, *Adiridsho* and *Adirodsho*, are nearly in a complete state of culture, comprizing a very extensive tract, which is laid out into rice plantations, and on the whole favourably situated for an annual crop. This portion of Aya forms a pleasing contrast with the neighbourhood of *Jittis* in the east, and that towards Talachap in the west; but towards the acclivities of the ridges in the direction of Pringtuttul and Doplong, the territory is again covered with a wild, and, from its distance, unprofitable vegetation.

August 22.—I went on in the morning southerly to Bunton, situated near the Ocean at one of the former outlets of the river Serayu, which is now completely shut up. The discharge of the river is about one mile further westward. The passage across is effected in the same way as above mentioned at Chiching-goleng: the canoes or boats were larger; the raft of bambu, secured on two of these, had firmness enough to support several horses. Near the western banks two inconsiderable villages are situated, beyond which this part of Aya is a continued desert to *Tala-chap*, a small settlement, near the boundary of the Honorable Company's possessions under the Residency of Cheribon, opposite to the eastern extremity of a small

Island, distinguished among the natives by the name of *Nuso Brambang*, and by perversion generally called Nuso Kombangan. The road follows the direction of coast, and often comes out at the Ocean, affording a handsome prospect of the Island just mentioned in the west: vegetation is on the whole more diversified and interesting than in similar situations, and I collected several, subjects which will be mentioned in the botanical section. I arrived at Talachap about one o'clock. This neighbourhood contains now the remnant only of a once flourishing settlement: it has been nearly ruined by the repeated visits and depredations of the pirates, arriving (probably) from the Islands of *Linga*, *Riouw*, and several others near the southern extremity of the Peninsula of Malakka, well known for their nautical enterprizes. It is painful to observe, on the spots of the former villages, nothing but the indications of a more flourishing period. Extensive clusters of Cacoanut trees still remain, of others the decapitated stumps only exhibit signs of the wanton licentiousness of these adventurers. The frames of several of the principal houses are observed above the high grass with which the ruins of the villages are covered. During the last two years the settlement has again in a small degree revived, and several of the former inhabitants have returned: to this has chiefly contributed the security and protection which is afforded them in various ways by the British Government: not only by the establishment of a stockade or small fortification on the north-eastern point of Nuso Brambang, commanding the entrance of the Strait which is formed between

this Island and the coast of Java, and leads to an extensive bay at the southern part of the district of Sukapura, called *Segoro-anakan*, but particularly by keeping in awe the pirates from the Islands above mentioned, and those Malay Princes who are in the habits of supporting them. The visits and enterprizes of the pirates were not confined to the neighbourhood of this settlement: by ascending the rivers which discharge themselves into the strait and bay, they proceeded to the center of the Island, Sukapura. Dayu-luhur, and Juruk-leggi were equally exposed to their invasions. Many of the inhabitants were carried off in slavery, or obliged to retire to places of greater safety, and the villages were plundered and destroyed.

The situation of Talachap, though pleasant and interesting on account of the prospect it affords to a temporary visitor, is by no means desirable as a permanent residence. The exhalations from extensive swamps which surround it, occasion remittent bilious fevers, which carry off many of the inhabitants: there is likewise a deficiency of rivers and rivulets of a moderate size, for the purpose of laying out rice-gronds cultivated by inundation. In the course of the following days I visited the remains of a former settlement at *Donan*, near the discharge of the river of Juruk-leggi, the Strait running towards Segoro-anakan, and an extensive range of the opposite coast of Nuso-Brambang. On the 24th, I returned to Adipollo.

Within the distance of three miles, the three principal villages of the district of Aya are situated; Adipollo, Adiridsho and Adirodsho. A

river of the same name flows by the latter, and discharges itself into the Ocean at the foot of a transverse ridge of hills, which has the same direction as the Peninsula of Karang-bollong: its constitution is likewise similar: it terminates precipitously at the Ocean, and contains a cavern which is inhabited, although sparingly, by the esculent swallow. The district of Aya is at present administered by two chiefs, under the superintendence of the Tommong-gong of the province, who have the title of Ingebey or Behi: one of these resides at Adipollo, the other at Adiridsho. I returned to the capital by the same road, and after the arrangement of my plants, and the completion of the outlines of various drawings, I prepared for an excursion in a different direction.

I crossed the river of Serayu near the dwelling of the Chinese farmer of the Customs at the capital, and went on directly north about three miles to the large village of *Suko-rodsho*, situated near the eastern boundary of that subdivision of the province which is denominated *Passir*. After a considerable acclivity, about ½ of a mile beyond the river, the tract is nearly level, rising very gradually towards the large Mountain of Tagal, situated north-west from this place at the distance of about 8 miles. The environs of Suko-rodsho are at present in a very flourishing situation; the villages are large and surrounded by extensive plantation: various ridges, connected to the central hills, appear at a distance; many of these have also been cleared for plantations of Mountain-Rice and Cotton. Numerous rivulets and rivers descending from the large Mountain irrigate this and the adja-

cent districts. I went on from here to *Purwo-kerto*, the chief village of the district of Passir; the country here is in an equal state of culture and scarcely perceptibly rises towards the north. The cultivation extends to the foot of the ranges in the south, beyond which several villages are dispersed; the chief of these, in a district of the same name, is *Juruk-leggi*.

September 8.—I proceeded in a western direction: the territory is cultivated in the same degree as that which I passed yesterday; two large rivers, besides numerous smaller streams, descending from the northern hills, afford a plentiful supply of water: about six miles westward of Purwo-kerto, the road gradually approaches the branches of the central ranges running out in this direction, and inclining, in the north, to the western declivities of the large Mountain of Tagal: from the foot of these hills to the westward, the degree of cultivation gradually diminishes, and the tract becomes uneven, but a considerable settlement exists at Atshi-barang, where I arrived about noon.

Adshi-barang is a small district stretching westward to *Dayu luhur* which is situated at the furthest boundary of the possessions of the native Princes; this tract is rarely visited by the inhabitants of Banyu-mas and Adshi-barang; I could obtain little satisfactory information concerning it: it is described as being covered with forest, deficient in population, and almost inaccessible on account of the imperviousness of the roads.

The settlement of Adshi-barang is improving; the villages are chiefly laid out in the vallies between the ridges, which transmit nu-

ble from the capital, I deferred the minute investigation to another opportunity, after my return from the wes ern divisions of the province; I therefore went again to the principal village on the southern declivities of these ranges, and during various leisurely excursious, collected from the hills which are still covered with the original stock of vegetables, many interesting objects: these are enumerated in the catalogue of plants, and among the trees and shrubs, many remain for future inves igations.

When I first arrived at the capital of Banyumas, the Tommong-gong or native governor was still at the court of the Susuhunan, but his return not long after my arrival, towards the end of the month of Ramadan of the Arabs, uniformly denominated Puwasa by the Javanese, tended both to facilitate my researches in his districts, and to afford me an opportunity of noticing some peculiarities in the mode of life and the government of the natives in the distant provinces. To detail these would be foreign from my object at present: it is sufficient to observe that the life of a large proportion of the subjects of the native princes is divided into two periods—one portion is spent at the court or residence of the sovereign, and devoted to his service; during the other they are permitted to return to their homes, to cultivate their plantations, and to prepare for the next period of service at the capital. Persons of rank and distinction are attended by their wives and families; but among those of the lower order these are necessarily employed in cultivating those grounds which are allotted to their support. These periods are in genaral nearly equal; but

they depend, in a great measure, on the pleasure of the prince, and on the urgency of those duties he chooses to impose upon them at the capital.

The Tommong-gong had arrived about 8 days before the feast celebrated on the last day of the month of Ramadan. Having returned from one of my excursions on the evening immediately preceding that feast, I could not excuse myself from being present at the entertainment, which was, as customary, given after the more serious ceremonies of the festival had been gone trough. The numerous relations of the native governor, who are mostly employed in the various offices of this province, tended to give a greater degree of vivacity to the celebration than might be expected in a distant village: in every thing the customs of the capital were imitated, and under the idea of paying respect to the sovereign, the Tommong-gong received that abject reverence which contributed to give him the appearance of a prince. This is the case in all the distant provinces, and perfectly consistent with the Javanese Government or despotism; and even Ingebeys and Demangs exhibit, on these occasions, not a little parade.

In the course of my continuance in this province, the Tommong-gong was zealous to give me every assistance in the prosecution of my researches: travellers depend, in the districts of the native Princes, on the good wil of these people, altho' this is obtained by the recommendation of the prime minister at the court, and the mode of travelling necessarily followed in a country where the oriental and feudal customs prevail in their full extent, affords many instances of the dependence on the character of the

chiefs. Nothing can be obtained by a pecuniary emolument, unaccompanied by the order of a chief, and force has often occasioned a temporary desertion of the inhabitants.

In my return I followed, to Segalo, the large road leading from Banyu-mas to Surokerto; *Purwo-rejo* and *Gomuro* are, in the province of Banyu-mas, the principal villages on this road; the last belongs to the district of Banjar: *Kutto-waringin* is a considerable village at the eastern extremity of this district. Here I left the large road and went on in a northern direction, crossing the large river of Serayu a few miles before the influx of the Merawu. Between Gomurru and Kutto-waringin I had a favourable opportunity of taking the Mountain of Tagal, the Sundoro, and the Sumbing, into one point of view, and to determine their relative situation.

October 18.—I halted at the principal village of the District of Bandshar, near the foot of the ridge of hills which rises again to the North of the valley that transmits the large river: it is situated near the banks of the stream Merawu, above mentioned, and contains, according to estimate, about 1000 inhabitants. The roads passing through this village are broad and regular, resembling in their distribution these of the capital of this province. This village appears to be in a prosperous condition, the environs are fertile and well watered, and the cultivation is luxuriant.

In departing from the large road, my object was to investigate the extensive ridges which occupy this part of the Island, and to traverse a tract which promised a greater abundance and variety of vegetable productions than could be expected on the common route.

" *October* 19.—I proceeded from Bandshar Northward: the road first inclines to one of the most considerable points of the central ranges the hill *Pawinian* (the situation of which is noted on the Map) and then passes between this and a very steep, conspicuous pile of perpendicular rocks, called *Gunung Lawet*; it consequently winds round the Northern declivities of the hill Pawinian, towards the Western extremity of which I entered the District of *Karang-Kobar*, and halted at the small village of *Pagger-pella*.

The District called Karang-kobar occupies a considerable portion of the central hills: these are here very multifarious, of very different extend and elevation, running into each other without exhibiting any regular distribution. Their general direction is from North East to South West, which is also indicated by the course of the rivers. They are very instructive in a mineralogical point of view, and their constitution will be explained below. Travelling in these parts is by no means facilitated by the condition of the roads; a path, following the windings of the hills, generally leads from one village to another, but where the tract is cultivated, the traveller must find his way over the mounds which separate the rice fields. To any enquiries on this subject, the inhabitants coolly reply that roads would be of little use to them and not reward the trouble of making; and as there are no native chiefs of superior rank who travel trough this district, the influence of the separate Demangs, between whom this tract is divided in small portions, is insufficient to ex-

cite the whole population to the improvement of the roa's. On this account, as well as to obtain more time for botanical and mineralogical researches, I went on only a few miles every day. After leaving Paggar-pella, my next halt was at Karraug-kobar, the chief village of this district, situated in a concavity, surrounded on all sides by small rounded hills. The climate here is cool; from the chief village of Bandshar, situated near the river Serayu, in the lowets part of the centre of the Island, the country gradually rises towards the North. The soil is fertile and produces abundantly, but the trade with the neighbouring districts is not considerable, on account of the distance of a market, the condition of the roads, and various other impediments.

October 21.—I went on to *Kali lunyar*, and the following day to *Nusupan*; both these villages belong to Karang-kobar: the gradual ascent of the territory continues on the whole route, and the numerous hills are in many parts covered with a great luxuriance of vegetation: my botanical collections were therefore increased every day. On the 23d, I proceeded to *Batur*, which is a separate district, at the Eastern extremity of Kurang-kobar. It is well known on account of an extensive establishment of Chinese which is formed here: I found a large village, more regularly laid out than those of the Javanese, inhabited chiefly by persons of that nation. The dwelling of the chief was built in the usual stile of the Chinese, and the whole was surrounded by a regular stockade or wooden barrier This village, like the others dispersed solitary through these elevated regions

has, at a distance, a peculiar appearance: all the houses are naked and exposed not being surrounded, and partially concealed, by clusters of Cocoa nut and other fruit trees, as in the lower tracts. The climate of Batur is comparatively cold, and the inhabitants employ and require a suitable clothing. I observed many of the principal Chinese to wear jackets lined with the prepared fleeces of sheep, which during the morning, are very comfortable. The appearance of the inhabitants is ruddy and healthy. Europeans find the same clothing necessary which is employed during the winter in Europe. The Thermometer descended on the 26th of October to 53° of Fahrenheit's scale; but from the month of May to August, it is much colder. I observed, in the houses of the Javanese inhabiting the neighbouring villages, a large space covered with heaps of ashes near the centre: several large stones serve to support the logs of wood, which are kindled here in the night. This place like all the elevated parts of the Island, has a peculiar vegetation. Cocoa-nut trees, plantains, and the common fruit and domestic trees of the lower tracts are not found; in place of these, many European vegetables grow luxuriantly if planted, several are spontaneous, and evidently belong to the original stock of the vegetables of this Island; these will be pointed out in a subsequent section. A few have been accidentally introduced by seeds, mixed with the culinary seeds brought from other countries. The vegetable productions of this Island form an excellent indication of the height of particular districts, and a principal object in my botanical remarks has been to determine

with some accuracy the geography of our indigenous plants.

Immediately to the North of Batur is a steep hill, the Gunung *Prahangan*; which has about 1000 feet perpendicular elevation above the level of the surrounding territory: to the South of this village the country is uneven, and the declivities descend chiefly in a direction from North-East to South-West, being divided by numerous ravines. Extensive tracts are covered here with plantations of Tobacco; this, with Indian-corn, is the chief object of culture: no rice is produced on account of the elevation of the tract. The Tobacco is exported chiefly to the maritime districts, and the Chinese here subsist by a small traffic with this article, for which they bring hither various requisites from the Northern provinces.

This neighbourhood was interesting to me not only for the purpose of bringing together a general collection of many vegetables of high situations, but also in a Mineralogical point of view. A considerable range of hills rises in the north above the surrounding level: one of these has already been mentioned; they follow on the whole the direction from West to East; several of the principal points are described in the Mineralogical section. A branch of the large volcanic chasm, which exists in the bowels of the earth, in this latitude, shews itself by several considerable outlets; a short distance west of the large Mountain Sundoro, we find the smaller ones of the Gunung Praû, of the Pakerman and of the Roggo-sumbangan. The Pakerman is situated within a few miles of Batur, and is well known in the neighbourhood, in conse-

quence of a singular volcanic phenomenon which occurred about 30 years ago, and will be described in the Mineralogical account of this district. The *Guwa-upas* is dreaded by the natives, and according to their account, resembles the Grotto del Cano near Naples; they could not be prevailed on to conduct me to this opening; it is situated at no great distance from the crater, which discovers itself by the discharge of volumes of smoke at intervals.

From Batur my course was eastward, inclining gently to the north, rising higher on the successive ranges of this part, and passing many of the separate points and ridges, and several very deep ravines. On the day of my departure from this village, *October 27th*, I halted at *Konang*, a small hamlet, surrounded by a circle of eminences, to the north of which rises a considerable point, well known to the natives by the name of *Gunung Diyeng*, and connected with the more elevated eastern point, which at a distance receives the denomination of Gunung *Praù* (from its resemblance to an inverted boat or proa) although at this spot its numerous points are distinguished by separate appellations.

A traveller here does not suppose himself to be in an equinoctial region; he perceives the air cold during the day, and possessing at night a degree of keenness, which, on suddenly arriving from the lower country, is even unpleasant; no Cacoa-nut or plantain trees are about the village; he finds himself surrounded by a new tribe of vegetable; he is invigorated, and capable of a degree of activity which appears incompatible with the nature of a hot climate. Severe bodily exercise is not fatiguing, but even

desireable, and necessary to procure a pleasant temperature of the body when not warmly clothed. In the forests, the trees are enveloped with long, shaggy, depending moss, as in the coldest countries in Europe. Only a few solitary birds enliven the air; these are of a peculiar kind, and never seen in the lower regions. Natives of other parts of the Island, suffer immensely when suddenly transferred to this neighbourhood: the half naked coolies are uniformly found in the night huddled together in groupes, and enjoying the heat and smoke of a few burning chips.

The ancient inhabitants of this Island, of whose history, religion and peculiarities all indications are now uncertain, appear to have delighted in this vicinity, as well as in similar situations at no great distance from the principal volcanoes. A *Chandi*, Temple or Tomb, was found near the foot of the eminence of the Diyeng, not far from a constantly smoking crater, surrounded by numerous *Re-jos* or images, most of which have been carried away or destroyed by the present inhabitants. In proceeding on my route, and commencing again the descent of the Mountain Praù, after having for several miles followed an eastern course from the village Konang, I met and afterwards pursued along the whole declivity, one of the most stupendous remains of the ancient inhabitants, which, in my opinion, is found on the Island. At no considerable distance from the summit of the Mountain, I observed a nearly regular slab, which I at first mistook for a fragment of the common Basaltes of the neighbourhood, but was informed by the natives, that it was the indication of an artificial work; I very soon met the commencement of a stair, construct-

ed of this kind of stone, and the lava of the vicinity, regularly chiseled and worked into oblong plates, conducting, from this spot, towards that part of the foot of the Mountain on which the declivity becomes less precipitous. My estimate concerning the perpendicular height along which this stair descends brings it very near to 1500 feet: at lower part it gradually runs off or passes into a pavement, constructed of the most regular slabs of Basaltes collected in the environs. This stair has not been preserved complete to the present period; the traces are frequently broken or obterated, by currents of water descending with impetuosity in accidental excavations, and the present road deviates in many places: but at intervals 3 or 4, and sometimes 10 and more steps are found nearly entire. The breadth of the steps is three feet; the stair through the whole extent was bounded by a small margin, rising at each side about a foot in heigh, regularly worked from the same materials.

On this descent I had an excellent opportunity to increase my collections of the plants of high situations: I found numerous ferns not previously noticed, and, with a large number of shrubs and trees uniform in places of the same elevation, several that were new. After a short halt at *Kayu-rangkang*, I proceeded to one of the principal villages of this district, denominated (like the whole tract) *Kali bebber*. From Kayu-rangkang, the descent is very gradual: it is divided by many ravines, which transmit rivulets. and give a great degree of productiveness to the soil. The situation is still considerably elevated, and the temperature cool. I crossed again near *Jawar*, a small Chinese

farm, the river Serayu, descending with a rapid course from the Northern ridges.

The copiousness of my collections on the descent of the mountain Praù made it necessary to halt several days at this place, to add the subjects to the Herbary and to complete the drawings. Kali-bebber terminates, in this part, the territory of the Native Princes, being bounded in the East by the district of Kadu: it comprizes in the North the greatest portion of the mountain Praù, extends in the West to Karangkobar and Segalo, and in the South to Ledog. It is less hilly and irregular than the districts I had previously passed, and appears to be on the whole well cultivated: but little attention is paid to the condition of the roads, and a traveller often finds it convenient to follow the beds of rivulets, and the mounds which separate the rice plantations.

At Kerteg, whither I went the 31st of October, I found a small village inhabited by Chinese, attached to the Farmer of the Customs; on the road I had passed the boundary between Kali-bebber and *Ledog*. The vicinity of this place to the two large Mountains of this part of the Island, the Sundoro and Sumbing, was convenient for determining their relative situation; the road Eastward from Kerteg passes gradually into the large valley by which they are separated, rising gradually towards *Redsho*, situated on the highest part, nearly equally distant from each.

This valley has a regular, almost uniform bottom of considerable breadth, from which the territory gradually rises to each Mountain, the sides being intersected by deep ravines.

Many of these give rise to rivers and rivulets; most of the principal streams of this part of the Island spring from these mountains; the *Bogowonto* and *Progo* flow in a Southern direction, the *Begalo* and *Serayu* follow a Western course in the central valley of the Island. The village of Re-jo is situated at the boundary of the districts of the Native Princes in this part; it has derived its name from several large stone images or *re-jos*, which are carefully preserved in the middle of the road in a small appropriate building, and receive tokens of veneration from the inhabitants and from occasional passengers. On leaving the broad valley between the two mountains above mentioned, an extensive prospect opens on the traveller, exhibiting, at one view, the lower portions of the province of *Kadu*, consisting of an infinite number of hills. thrown together without order, and resembling the agitated waves of the Ocean. On entering this tract the state of cultivation rapidly increases, in every direction large villages are indicated by immense assemblages of cocoa-nut trees; and extensive plantations of Rice, indian-corn, Tobacco, and almost every kind of vegetable serving for the common domestic economy and nourishment of the inhabitants, bound the prospect.

The traveller here finds his progress greatly facilitated; having traversed districts in which all conveniencies of passage are left to accident or appear to be intentionally neglected, he perceives, in the excellent condition of the roads, a careful attention to the means of intercourse between the various parts of this as well as

with the neighbouring districts: agreably to the state of the country the course of the rivers and rivulets is uniformly rapid, and substantial bridges, in place of the temporary rafts of bambu, employed in the districts of the Native Princes, afford a further proof of a wise administration.

Between *Jittis* and *Pakkiswing*, whither I proceeded on the 3d of November, the inequalities of the tract are less considerable than on the preceding route; about one mile West of the latter place I crossed the river Progo, flowing with a rapid stream from the North. The road soon approaches the Western foot of the *Marbabu*, and of a smaller mount called *Andong:* beyond the basin of the river *Ello* it gradually ascends, and traversing numerous ravines, reaches the more elevated declivities towards the top of the Marbabu; it here passes successively the villages of *Kamantran* and *Koppeng*, and consequently descends again through many intervening vallies to the Eastern foot. Leaving the usual route from *Koppeng* to *Salatiga*, I went on directly East, and met the high-road, leading from Samarang to the Capitals of the Native Priuces, at *Kali-Gandu*. In the afternoon of the 4th of November I returned to Souracarta.

POSTSCRIPT.

List of proper names from the first Section of the Essay.

It is to be observed that the sound employed by the Javanese, in expressing the letters, has been followed as nearly as possible, viz.

Javanese	*English*
Ho,	H
No	N
Cho (or Tsho)	Ch
Ro	R
Ko	K
Do	D
To	T
So	S
Wo	W
Lo	L
Po	P

Ddo, has a peculiar sound, resembling a double *d*, which can only be properly expressed by a native: it is indicated by *dd*.

Jo (or Dsho) Joo	J
Yo	Y (consonant)
Nyo	Ny
Mo	M
Go	G
Bo	B

Tto, answers to the double *d*, and can only be expressed by a native; it may be indicated by *tt*.

Ngo	Ng

The vowels are uniformly sounded as follows:

a broad, as in h*a*ll
e (as a in common) as in b*e*t
i (as ee commonly) as in f*ie*ld
o as in note
u broad, as in bl*u*e

The syllable which has a long protracted accent is marked with ‑ as in Weddi; ‿ indicates a very short enunciation, to throw the accent with more force, on the other syllable. This sign' simply denotes the accented syllable, as Kérto; C is *never* employed alone, as, in the numerous words where *e* follows, it would be undetermined whether to pronounce it hard or soft.

Kemadu	(Cemadu)
Kemiri	(Cemiri)
Keji	(Ceji, &c.)

Kendal, &c. &c. written with C, might be pronounced Semadu, Semiri, &c. K is sufficent for every purpose, not liable to mistake, and more consistent with the genius of the language,

LIST OF NAMES.

Sûro-kérto
Jókjo-kérto
Mattâram
Kérto-sûro
Marâpi
Marbâbu
Manching-an
Kâdí-langu
Bûbutan
Jónno

Jâli
Wêddí
Bâggâlén
Géb-bang (or Gúb-bang)
Ngámbal
Bán-jur
Bó-chor
Pâtá-naãn
Káleng,

Note.—The *e* in this, and in many other words, has a sound which most resembles the English *u*, as in us, ugly, &c. being obtuse, and intermediate between *o* and *u*: it is expressed or indicated by a particular mark, called *pepút*; in this manner by the Javanese, and something similar must therefore be adopted to express it. Kaleng might be written Kálêng, Kalèng, or Kalùng. It is one of the most common and familiar native vowels, and occurs incessantly in their language, as *Ségé* or *Súggó*, boiled Rice—Nassi of the Malays. *Assûm*, Tamarind, Assam of the Malays. *Bádúg*, a fermented liquor, &c. &c.

Wêttón
Chi-ching-gôleng
Kâ-chang
Pág-ge-láran
Jíngkla
Jêttís or Júttís
Aya
Pring-túttul
Rômo
Jâti-nogóro
Selon-dókko
Dòplang

Bányu-más
Sêráyu
Káli-wêddí
Têdâ gángan
Ma-ös
Adi-póllo
Adi-ridjo (ri-jo)
Adi-ród-jo (ro-jo)
Tàlá-chap
Chéribon
Nûso-brámbang
Nûso-kombángān
Malákka
Suka-pûra
Segóro-ânakan
Dayu-lúhur
Jùrug-leggi (or lûggi)
Suko-ród-jo or ró-jo
Púrwo-kérto
A-ji-bárang
Tiád-jum
Kâbung
Dâtûr
Prôbo-ling-go
Gûnung-gêd-dî
Kumùtuk
Puwása
Bán-jar
Pùrwo-re-jo
Gomûru
Merâwu
Kùtto-waringin
Sundóro
Sùmbing
Pawï-nian
Lâwet

Karang-kôbar
Pag-ger-péila
Kàli-lúnyar
Bàtur
Parán g-an
Rôgô-jambángan
Guwo upas
Gunung-di-yeng
Chándi
Ré-jo
Ledóg
Kèrteg
Bêgálo
Kadú, better Kêdú

(N. B —I am uncertain whether it is not written *Gêd-dú* by the natives, it is often thus pronounced.)

Pakis-wíring
Andong
Ello
Kamántran
Kóppeng
Kali-gándu.

SECTION II.

Concise Geographical Sketch.

The Western Division of the territory of the Native Princes consists principally of

Mattaram (the Western portion)
Baggalen
Banyu-mas
Romo
Dayu-luhur
Merden
Lurung-tenga, Kerto-negoro, and several inconsiderable tracts.
Segalo
Karang-kokar
Ledog
Kali-bebber and
Gowong

A. In the Western portion of *Mattaram*, West of the Capital of Jokjokarta, the principal villages near the high-road, which are marked on the map with the corresponding numbers, are, (See the Index annexed)

Bantul
Bantul-karang
Bazar Tagal-layang
Brossot
Pattallan
Kademangan
Krettek
Karang-wuni
Kachubung-darat.

Kadilangu is situated on the Eastern banks of the river Bogo-wonto, which forms the boundary between the Mattaram and Baggalén. The largest river in Mattaram is the *Progo*, the principal branches of which will be mentioned in the next Section: it receives, near Brossot, a small branch from the West called Galur

The numerous hills which compose the Western part of Mataram are not comprized within the limits of this sketch; many separate ranges appear to descend from the Mountains Sumbing and Koripan, directing the course of the rivers of Progo and Bogo-wonto.

B. The province of Baggalén, not only in point of extent, but particularly in regard to the state of culture and population, is one of the principal districts under the administration of the Native Princes: although it contains no capital with an excessive population, a large number of considerable villages are scattered over its whole extent: these are in greatest proportion appropriated to the domestic services of the Princes, the "*Gladak*"—and are administered by a Tommong-gong from Sourakarta and from Jokjokarta. As it would swell the catalogue unnecessarily, I shall only enumerate the principal villages on the great Southern route to Karang-bollong, those on the route which I followed, and several of the principal sub-divisions, which have hitherto not been pointed out in the geographical sketches or the maps.

I. *Villages on the Southern Road.*

Wonno-rotto

Ngawu-awu

Tegges
Wollo
Wawar
Rowo
Telogo
Blengor
Benner
Ngambal
Banyar
Botshor
Perchuritan
Bedati
Patanaan
Kaleng
Wetton
Truntung
Klegen
Mungu

2. *Villages dispersed through the central portions of Baggalen.*

Jonno
Weddi,—two considerable Bazars which have been mentioned above.
Bubutan, a small Bazar.
Jenner, ditto.
Gebbang
Suren
Banyu-urib
Poppok
Punda
Brengkol
Plumbon
Gadungan
Lajir
Gessian

Kwangun
Tanjung
Pengilong

3. *a.* Near the Norhern boundary, and *b*, the Western extremity of this province, are to be noted.

a. *Samawung*, a considerable village, the residence of the Tommong-gong from Jokjokarta.

Seruy, Somalangu	small districts
Ungarang	
Selang	

b. Rangka, a small district, containing numerous villages

Kutto-vinangon, Jerakka	large villages

Most of these small tracts and villages (of the 3d divison) approach or are situated on the declivities of the central ranges, from which numerous rivulets and rivers have their origin. Bogo-wonto, the chief of Baggalen, has already been mentioned: *Lerreng* arises towards the Western extremity, flows through the centre of Baggalen, and receives the rivers.

a. *Jati*
b. *Gobbang*, and several others.

The other rivulets arising near the Western extremity of this province take a Western direction, and unite to the river Chiching-goleng, a considerable stream, which follows the direction of the ranges of Karang-bollong.

The Southern portion of Baggalen is low and level; the Northern gradually rises towards the central ranges, but comprizes no Mountain of any importance; the particular denominations of the hills composing these ranges have not been as yet accurately ascertained: along the Northern boundary of this province, commencing in the East; we find the following districts:

1. *Gowong*, consisting chiefly of the Southern declivities of the Mountain Sumbing. (The villages, rivers, hills, &c. of this district have not yet been noted with accuracy.)

2. The Southern extremity of *Ledog*.

3. The small district of Selo-manek or Kali-wiro.

4. Segalo (which will be mentioned below.)

5. The district of Panjer (one of the subdivisions of Banyu-mas, to be mentioned in the sequel.)

6. The district of *Romo*.

c. *Romo* is a considerable tract which has the same constitution as Baggalen: in the East, the North and West it is bounded by the hilly tracts of Banyu-mas, in the South by Rangka (one of the smaller sub-divisions of Baggalen) several considerable points of the central ranges occupy its Northern ports; its rivers and rivulets descend uniformly to the Chiching-goleng. Among many villages which are dispersed through this tract I shall only notice *Jatinogoro*, the principal, and residence of a Tommong-gong who administers here on behalf of the Sultan,—and *Kranjingan*, a Chinese farm; both are marked on the map.

d. Between the river of Chiching-goleng in the East, and that of Aya (one of the sub-divisions of Banyu mas) in the West, several successive ranges of hills are found, which have a direction from North to South, and, projecting considerably beyond the general stretch of the Southern coast, form a peninsula, which, from the chief village of the neighbourhood, has been denominated the *Peninsula of Karang-bollong.* In ancient times this formed a part of the province of Banyu-mas; it has been mentioned above; and since the regular administration of the caverns in which the Edible-Bird's-Nests are found, has been considered as a separate district. The general appearance of this peninsula will be described in the succeeding section. The chief villages are—

Karang-bollong	
Wollo Poris	near the bay of Passir
Jeladri	
Guntur Karang-mangu Suwu	three hamlets at the mouth of Chiching-goleng.
Jumennar Karang-Selo Nagassari and Jinkla	on the route towards Aya.

The principal caverns in which the Bird's Nests are at present collected are:

Guwo-Dahar
Guwo-Geddé
Guwo-Nagassari, and
Guwo-Jingkla.

Of the numerous points which rise more precipitously from the ridges composing this pe-

ninsula, the denomination of few is uniform and determinate among the natives: *Karang-kuda* has been pointed out on the map—at the termination of the Eastern ridge a cavern is found from which the settlement has derived the name of *Karrang-bollong*.

The rivulets arising from these ridges unite to the Chiching-goleng in the East, and to the river of Aya in the West.

The province of Banyu-mas occupies a very considerable portion of the territory of the Native Princes; it is bounded by the district of Segalo in the East, and by several of the subdivisions of the district of Cheribon in the West, stretching transversely from the southern Ocean to the declivities of the Mountain of Tagal. It is composed of the following subdivisions, viz.

a. Aya
b. Panjer
c. Passir
d. Probolingo, and
e. Banjar

exclusive of the environs of the capital. *Aya* commences at the peninsula of Karang-bollong in the East, and extends in the West to the river of Juruk-leggi, which discharges itself beyond the Eastern boundary of the Island Nuso-Brambang, occupying a length of coast of nearly thirty miles, its breadth is also considerable; the Northern portions comprize the declivities of the central ridges; near the shore it is low and marshy.

Its principal villages and settlements are near the southern Ocean, between the discharge of the river Serayu and the hill Bedagangan—here an

extensive tract is in a state of culture. The principal villages are:
Adipollo
Adiryo
Adirojo
Sawangan
Bunton
Karang-pandan
Winong.

To the Eastward of the hill Bedagangan only solitary villages are found dispersed through an extensive tract, the greatest portion of which is a marsh, or an inaccessible wilderness; those which deserve notice are:
Widoro-pajung
Jittis
Aya, and
Doplang.

On the route from the capital to this district we note
Wono-seppi
Maos
Kali-weddi
and various smaller villages dispersed through the neighbourhood; and
Penggalan

Towards the boundary of Romo we note:

Selondoko, and, near the Western extremity, the settlement (at the boundary of Cheribon) Talachap, with the adjoining small tracts of
Donan
Jojok and
Juruk leggi
which have severally been mentioned in the Journal.

b.) *Panjer*, the second sub-division of Banyu-mas, is somewhat removed to the Eastward from the other districts of which this province is composed: the district of Romo, which bounds it in the West, is as it were intruded between Panjer and Aya. The Southern part of Panjer is level and in a high state of cultivation; it is here bounded by the Baggalen. In the North it is hilly, and, like the other tracts on the central ranges, contains only a scanty population.

Kabumen is one of the most considerable villages of this district.

c.) *Passir* is the most westerly of the divisions of Banyu-mas, and extends to Dayu-luhur and several tracts belonging to the Residency of Cheribon: in the North it is bounded by Lossari and Tagal, in the South by Aya, and in the East it is united to the following sub-division of this province: the Southern and Eastern portions have a gradually inclining situation, and are chiefly in a state of cultivation. In the West and North it is hilly, the culture and population is not considerable.

Suko-rojo and
Purwo-kerto

are two very considerable villages, at each of which a native chief (*Behi*) resides, who is subordinate to the Tommong-gong who administers the province.

Aji-barang is a small tract near the western, and *Kumutuk* near the northern boundary of Passir; through all these numerous villages are dispersed, but only the principal have been noted on the map.

d.) *Probolingo*, the fourth sub division of Banyu-mas, has the same local constitution, and a similar state of cultivation; it is bounded in the north by Bobotsari, Kerto-negoro and Ji-anna, in the east by Banjer, and in the south, by that part of this province which is annexed to the environs of the capital. Its villages are very numerous. Probolingo, the chief, has alone been noted on the map.

e.) *Banjar*, the last sub-division of this province, is the most easterly in its situation; its form is on the whole oblong, and it stretches far from west to east. Its constitution is more diversified than that of Passir or Probolingo—it is, on the whole, uneven or mountainous, but many of its uneven districts are in a high state of cultivation: they are covered with a fertile soil and are well watered.

Banjar is bounded in the west by Probolingo, in the north by the Honorable Company's maritime districts Pamalang, Pakalongan, &c. in the east by Karang-kobar and Segalo, and in the south by Panjer and Merden. Among its numerous villages I shall only point out *Banjar* (the chief)

Winorong
Gomuru
Kutto-Waringin, and
Gunung-Raja

Besides the five districts above enumerated, the revenue of which is claimed almost exclusively by the Sovereign, a considerable portion is appropriated for the private revenue of the Tommong-gong, who administers the province.—It

comprizes the environs of the capital, a large village also denominated *Banyumas*, and a long narrow tract extending on both sides of the river Serayu, towards the small tract of *Lurung tenga* or *Kali-werdong*, which is here intruded between the divisions of Banyu-mas.

Besides the capital, where the Tommong-gong resides, are chiefly to be noted the villages

Sama-gedé
Gomellera, and
Purwo rejo.

Among the *Mountains* and *Hills* of this province, the Mountain of Tagal, denominated by the natives *Gunung-Gedé*, or the *large* Mountain, and various branches of the central ranges, extending longitudinally through the whole of this division of the Island, deserve particular notice. The Mountain of Tagal stands at the boundary of this and the northern districts already mentioned, and its declivities constitute chiefly the sub-divisions of Passir and Probolingo: the central ranges are on the whole arranged in two divisions, one on the north, the other on the south side of the river Serayu, each consisting of numerous smaller links, which are often disposed in succession and nearly parallel to each other. Besides this several ridges (arising near the western declivities of the Mountain of Tagal) extend through Aji-barang, Dayu-luhur, &c. towards the southern shore, meeting and uniting with the termination of the central ranges, which, to the west of the capital of Banyu-mas, also incline suddenly towards the south.

The names of all the separate points which were ascertained with accuracy are mentioned in the next Section, to which I therefore refer at present.

It may be proper, in this place, to enumerate in succession, the principal rivers of this part of the Island; several of these have already been mentioned; and, with few exceptions, they arise in, or pass through a part of the province of Banyu-mas. The river *Progo* alone, is entirely distant: the river *Bogo-wonto* (forming the boundary between Mataram and Baggalen) receives a principal branch of the river *Lerreng*, which arises near the Western boundary of the district Panjer. Several of the principal branches of the river *Chiching-goleng* arise from Panjer, and from the Eastern extremity of Aya. The *River of Aya* receives its sources from various branches, exclusively from the province of Banyu-mas; their direction is pointed out on the map; the branches from *Pring-tuttul*, *Selondoko* and *Cheleman* are the chief; they unite in the lower part of the district of Aya, and then follow the direction of the ranges of Karrang-bollong to their discharge into the Ocean, Another principal river of the tract of Aya flows into the Ocean at the Western foot of the hill Bedagangan: it is called the river of *Adirojo*, and has two principal branches, one from *Doplong*, another from *Kaliwedei*, which receive many small rivulets from the Northern hills of Aya, and contribute to innudate this tract.

Following the coast to the Westward, we meet, about five miles from Adi-rojo, the outlet of the river *Serayu*; this is one of the largest

streams of this Island; its source is near the North-western declivities of the Mountain Sundoro, from the hill Jajar (inclining to the Northern parts of the Mountain Praù) its course is first from North to South, having passed the districts of Kali bebber, Ledog and Segalo, it enters the province of Banyu mas, through which it flows to the Ocean. Soon after arriving in Ledog it turns to the Westward, and continues in this direction till beyond the capital, and then inclines South to its discharge. It follows, on the whole, the direction of the large central valley in this part of the Island, which is confined in the North and South by the ranges of the central hills above mentioned. The Eastern branches will be mentioned in the sequel; soon after its arrival in this province, it receives the *Merawu*, a large river from the North, and subsequently the rivulets of

Blimbing
Mendong
Sapi
Deris, and
Piosso, from the South.

In this part of its course no considerable branch enters from the North, till the river of *Klawing*, which unites to it near Soma-gedé, carrying down the waters of numerous streams from the Northern ranges, and from the mountain of Tagal. Besides various other branches the river Klawing receives the

Gintung
Kelahan
Tambra
Pekachangan,

and, near its union with the Serayu, the River *Pellus*, which traverses the Eastern parts of Passir, and receives many subordinate streams, among others the

Bellud
Bakkal
Benner, and
Bagur.

Another large branch from the North unites the various rivers and rivulets of the central portion of Passir, which, as well as those flowing into the river Pellus, have their source from the declivities of the mountain of Tagal; it is called *Lo-gowok*, a principal branch is the river *Banjaran*, nearly of equal size; both receive numerous rivulets in the higher districts, of which the names were not ascertained with accuracy. The Lo gowok falls into the Serayu, several miles West of the Capital.

The Western declivities of the mountain of Tagal, and the adjoining central Ranges in that direction, furnish three rivers which unite southward of Aji-barang: The *Datar* flows near the principal village of that District, the *Kawung* a few miles Westward, and still further in the same direction the *Tiaium*; the two former having united to the latter, it subsequently takes an Eastern direction, and meets the Serayu several miles to the South-West of the discharge of the river Lo-gowok.

Very near the mouth of the Serayu, it receives from the West a large branch, of no distant source, conveying the waters of the lower marshy districts, which accumulate at the Southern declivities of the central ranges: it is

denominated *Bengawang Brondong*, being broad and admitting the tide to a considerable distance.

Very near the Western boundary of this province we find the river Juruk leggi, which near its discharge resembles the Bengawang Brondong: it receives various branches from the districts of Dayu luhur and Cheribon.

f.) The district of *Dayu-luhur* is situated at the Western extremity of Banyu-mas, being bounded in the North Brebes, and in the West by several of the sub-divisions of the Regency of Cheribon; in the South it is united to the tract called *Jeruk-leggi:* from the information of the natives at Aji barang, the greatest portion of it is in a state of wilderness, and many of the inh bitants of the Southern extremity have been carried off by the pirates, in former years, or have removed to situations of more security in Cheribon and Banyu mas.

At the Eastern extremity the province of Banyu-mas is united to *Karang-kobar*, *Segalo* and to the Northern portion of Baggalen: this parts of the Island is troughout a succession of hills and mountains, having on the whole a longitudinal direction, as far as regards the coasts.

g.) *Segalo* occupies the tracts on the North and the South side of the river of Serayu, rising in each direction by successive ascents and ridges towards Karang-kobar in the North, and the Northern ranges of Baggalen in the South; the face of the territory is very uneven, and the inequality is increased by the numerous rivulets poured into the Serayu from the ridges on each side. Its villages are numerous, only the fol-

lowing are noted on the Map—Segalo (the principal) and

Sawangan.

h.) *Karang-kobar* has on the whole the same constitution as Segalo, but rises more precipitously towards the Northern ranges; these are enumerated and described in the succeeding section, as well as the principal hills near the common route from Banjar to the north. Here the principal villages are

Telogo
Pagger-pella
Karang-kobar (the chif village)
Kali lunyar, and
Panusupan.

The small tract of *Batur*, situated on the declivities of the Northern ranges, intervenes here between Narang-kobar and the following district.

i.) *Kali bebber* commences at the summit of the Gunung-prow in the North, and stretches to the district of Ledog in the South: in the West it is bounded by Karang-kobar and Segalo, in the East by the Kadu. It is composed, in the North, of the declivities of the mountains Prow and Wismo, and in the East of those of the Sundoro: its central tracts have an unequal constitution, rising and descending like the waves of the Sea. The village *Konong* is situated near the declivities of the mountain *Diyeng*, and at considerable elevation on the mountain Prow; near the foot of the latter we meet Kayurangkang and Menjer; further to the south Blederan, Jawar, Kalibebber and numerous

others. More extensive than the last is the district of

j.) *Ledog*, stretching from the declivities of the Sundoro and Sumbing, to the central ranges of Baggalen and Gowong; in the West it is bounded by Segalo, and in the East by the Kadu. The face of the country resembles on the whole that of Segalo, but its ridges are less elevated and regular. Its principal villages are Ledog and Baile-kambang: besides these are to be noted

Selo-merto
Bo-merto
Selo-Kromo
Krossak and Gunting Tawong
Kerteg
Gondong
Banyu-smurub, and
Rejo.

k.) The district of *Selo-manek* or *Kali-wiro* was formerly united to Lebog, but was separated from it by one of the former Sultans of Jokjokarta: it is not considerable in extent or population.

All the rivers from these various districts flow towards the central valley, and unite to the Serayu. In the Karang-kobar district the chief river is the *Merawu*, already mentioned above, which rises near Batur from one of the highest points of the central ranges; it receives the *Kali urang* (a considerable stream from mount Roggo-Jambangan) the *Telotto-suren* and *Pasuraban*, which are marked on the map.

The water from the more eastern points of the central ranges unite to the river *Tulis*, two branches of which, the *Kali-puti* and *Dolog*, arise from the hill Pakerman.

The eastern points of the central ranges, and the declivities of the mountain Sundoro, in the district of Kali-bebber, supply the first sources of the river *Serayu*, which here receives, besides the river Tulis, various other rivulets from the declivities of the Sundoro and Sumbing. The river *Segalo* arises from the southern and western foot of the Sumbing; having received the river *Gung*, and many others from all directions, its course is west inclining to the north: it is now nearly equal to the Serayu in size, and both streams unite at Selo-kromo.

The mountains of Sundoro and Sumbing form the boundary, in this part, between the districts of the native Princes, Kali-bebber and Ledog, in the west, and those of the Hon. Company, the Kadu, &c. in the east. They will be mentioned in the next section, as well as the other hills and mountains of the western districts.

As the plan originally proposed has only embraced a very concise geographical sketch of the territory of the native Princes, I shall, in prosecuting the further route, enumerate only several of the principal villages (whose situation is marked on the map) and point out the northern branches of the river Progo, whose discharge is in the first district abovementioned.

On leaving the declivity between the two mountains Sundoro and Sumbing, near the boundary of the Kadu, we meet

Kledung
Telahab
Baponan

Jittis
Parakkan
Selo-korung
Geddu-siwur
Pakkis-wiring
Sechang
Bazar-grabag
Kamantrang
Ngablak } under the Residency of Samarang
Kopping }
Kali-gandu, on the large road from Salatiga to Souracarta.

The river of *Progo* consists of two principal branches: the western receives this denomination from its source; the eastern is called the *Ello*. The former arises near the mountain Ungarang and the rangen west of it: it receives the river *Gale* from the monntain Sundoro and the *Sarangan*, *Jampirosso* and *Lungi* from the declivities of the Sumbing, besides unmerous other rivulets from east and west. The river *Ello* rises considerably eastward, likewise from the declivities of the mountain Ungarang, and receives two large branches from the mountain Marbabu, the *Daru* and *Bollong*: its course is for many miles parallel to that of the Progo, and after receiving several streams from the Marbabu and Marapi, it winds somewhat abruptly to the west and unites to the Progo, in a direction nearly south-west of Magellan, the capital of the Kadu.

GEOGRAPHICAL INDEX

To the Numbers Marked on the Mineralogical Shetch.

No. 1 Bantul
2 Bantul-karang
3 Bazar Tagal-layang
4 River Progo
5 Brossot
6 Rivulet Galur
7 Patallan
8 District-Kachubung
9 Kade-mangan
10 Kachubung darat
11 Krettek
12 Karang-wuni
13 Kadilangu
14 River Bogowonto
15 Bubutan
16 Bazar Jenner
17 Jonno
18 River Jali
19 Gebbang
20 Semawung
21 Weddi
22 Somolangu
23 River Lerreng
24 Kutto-winangon
25 Selang
26 Wonno-Rotto
27 Ngawu-awu
28 Tegges
29 Wollo
30 Wawar
31 Rowo
32 Telogo
33 Blenyor
34 Benner
35 Ngambal
36 Banyur
37 [illegible]ochor
38 Perchuritan
39 Bedati
40 Pataraan
41 Kaleng
42 Wetton
43 Truntung
44 Klegen
45 Mungu
46 Guntur
47 Barang-mango
48 Suwu
49 River Chichinggoleng

50 Villlage Karang-bollong
51 Karang-bolong
52 Guwo-Dahar
53 Guwo Gedè
54 Bay of Passir
55 Wollo
56 Poris
57 Hill Karang-kuda
58 Jeladri
59 Nagasari
60 Guwo-Nagasari
61 Village Jingkla
62 Guwo-Jingkla
63 Village Aya
64 River of Aya
65 Jettis
66 Widoro-Pajung
67 Pring-Tuttul
68 Jerakka
69 Adipollo
70 District of Rangka
71 Rogo-Donno
72 Rivulet Plemagan
73 Jati-Nogoro
74 District of Romo
75 District of Panjer
76 Kabumen
77 Rivulet Jju
78 Kranjingan
79 Selondokko
80 Rivulet Lebbeng
81 Hill-Chelenan
82 Banyu mas
83 Rivulet Banyumas
84 Hill Wonno-Seppi
85 Hill Kali-weddi
86 Kali-weddi
87 Hill Winongan
88 Karang-anyar
89 Doplang
90 Maos
91 River Serayu
92 Peng-gallan
93 Adipollo
94 Adiryo
95 Village Adirojo
96 River Adirojo
97 Hill Bedagangan
98 Selok
99 Sawangan
100 Bunton
101 Karang-Pandan
102 Winong
103 Bangawang-brondong
104 Plerenan
105 Donan
106 River of Juruk-Leggi
107 Talachap
108 Jojok
109 Banjar
110 Karang-Pachi
111 Ujung-agung

112 Brambang
113 Karang-Bolo
114 Juruk-Leggi
115 Hill Pellem
116 District of Aya
117 Rivulet Bagor
118 Suko-Rojo
119 River Pellus
120 Rivulet Bakkal
121 Rivulet Benner
122 Purwo Kerto
123 River Banjaran
124 Village Karang-luwas
125 River Lo-Gowok
126 River Datar
127 Aji-barang
128 River Kabung
129 }
129 } River Tiajum
130 Passaran
131 Petuguran
132 Windu-aji
133 Kali-erang
134 Galu-timor
135 Mount Tagal
136 District of Kemu-tuk
137 Karang-anyar
138 River Bellod
139 District of Passir
140 District of Pro-bolingo
141 Rivulet Kelagan
142 River Kelawing
143 Probolingo
144 River Gintung
145 Kerto-Negoro
146 Bobotsari
147 Jionna
148 Becbi
149 Sama-gedé
150 Rivulet Piosso
151 Rivulet Deres
152 Gemellem
153 Rivulet Sapi
154 Purwo-rejo
155 Bantar
156 Mendiraja or Lurung-tenga
157 Rivulet Men-dong
158 District Merden
159 Rivulet Blim-bing
160 Winorong
161 District of Ban-jar
162 Gemuru
163 Kutto-waringin
164 Legok
165 Cheng gawur
166 Banjar
167 River Merawu
168 Rivulet Winong
169 Mount Pawinian
170 Hill Lawet
171 Gunung Raja
172 River Urang
173 Telogo
174 Paggerpella
175 Hill Teloge-leli

176 Hill Sari
177 Rivulet Telotto-suren
178 Hill Akkar
179 Hill Pening-galan
180 Mount Roggo-jambangan
181 Karang-Kobar
182 Hill Krangeang
183 Hill Gaja
184 Rivulet Panara-ban
185 Kali-lunyar
186 Hill Lumbung
187 District of Ka-rang-Lobar
188 Panusupan
189 Hill Teki
190 Batur
191 Hill Ptarangan
192 Hill Pengang-gungan
193 Wora-wari
194 Hill Butak
195 Hill Pakerman
196 Crater
197 Guwo-upas
198 Village Kassirian
199 Village Jampang
200 River Dolog
201 Rivulet Puti
202 Hill Malang
203 Hill Nagasari
204 River Tulis
205 Mount Wismo
206 Hill Koppok
207 Hill Wager-Tipis
20 Konang
209 Mount Diyeng
210 Mt. Telogo-Je-bong or Prow
211 Telogo-Menjer
212 Menjer
213 Kayu-Rangkang
214 District of Kali-bebber
215 Blederan
216 Jawar
217 Chepokko
218 Kali-Bebber
219 Rivulet Ireng
220 Rivulet Prupuk
221 Mountain Sun-doro
222 Hill Kombang
223 Hill Arom
224 Hill Jajar
225 Hill Kendil
226 Rivulet Tum-belan
227 Rivulet Chechup
228 Limbangan
229 Rivulet Jappar
230 Rivulet Prum-pung
231 Kerteg
232 District of Ledog
233 District of Segalo
234 Segalo
235 Kendeng Besser
236 Sawangan

237 Selo-Kromo
238 Krassak
239 Gunung-Tawong
240 River Begalu
241 District of Selo-manek or Kali-wiro
242 Mountain Damakyu or Koripan
243 Ungarang
244 River Gung
245 Rivulet Simo
246 Gondang
247 Rivulet Jurang-Juruk
248 Banyu Smurub
249 Rivulet Buto
250 Rejo
251 Kledung
252 Mountain Sumbing
253 District of Gow-ong
254 Telahab
255 River Gale
256 Paponan
257 Jittis
258 Tersono
259 District of Kadu
260 Parakkan
261 Rivulet Parangan
262 Selo-Karung
263 Geddu-Siwur
264 Rivulet Jampi-rosso
265 River Lungi
266 River Progo
267 Pakkis-wiring
268 Rivulet Murug
269 Sechang
270 River Ello
271 River Daru
272 Bazar Grabag
273 Mountain Unga-rang
274 Hill Gaja
275 Hill Telomoyo
276 Hill Andong
277 Mountain Mar-babu
278 Mountain Marapi
279 Komantran
280 Ngablak
281 Koppeng
282 River Bollong
283 Salatiga
284 Kali gandu
285 Ampel
286 Buyulali
287 Magellan
288 Bojong
289 Semen
290 Jokjokarta
291 Selo Merto
292 Balle-Kambang.

SECTION III.

Mineralogical Remarks.

The following remarks are in immediate connection with the Essay on the Mineralogy of the Western parts of this Island, contained in a preceding part of this volume. Since this was written several years have elapsed: it was my original intention to continue, without interruption, the Mineralogical Essay to the Eastern extremity; this intention has necessarily been changed, but a favourable opportunity has occurred of examining more minutely several districts, which are comprehended within the limits of the first part of the mineralogical description, and as I have been enabled to extend my remarks on various points, it has appeared desirable that the former omissions should be supplied, and that several errors should be rectified.

On the tract from Souracarta to the Southern declivities of the mountain Sumbing, I suspend all remarks at present, as I have determined to make it an object of careful investigation.

From Jokjokarta to the peninsula of Karangbollong, the tract, in a direction directly West from the capital, is low, and bounded in the North by the central ranges of hills, which are observed at intervals from the large road, which follows nearly the direction of the shore. Not far from this capital several eminences are scattered in a Western direction, the nearest of which, being completely calcareous, is denominated *lime* hill, or *Gunung-gamping* by the natives, as it supplies the whole neigbourhood

with this article; between Brossot and Kadi-langu several hills descend towards the South, but the principal central ridges preserve a distance, varying from 10 to 15 miles, from the shore. The soil which covers this low tract is a mixture of clay and sand in various proportions; near the central range it consists chiefly of the former, and along the shore of the latter. Through the whole extent the shore is bounded by one or more ranges of low sand hills. From the river Bogo-wonto to the peninsula of Karang-bollong, this tract is annually inundated during the rainy season, by the waters brought down from the central ranges by the various branches of the rivers above mentioned, in the Geographical description. The intercourse between the different villages is now carried on chiefly by means of canoes or small boats; in the vicinity of shore the traveller passes conveniently over the more elevated sand hills; as the waters retire, the culture of rice is commenced, and most parts afford but a single annual crop. I have attempted to shew on the Map, the points at which the projections from the central ranges descend most towards the shore, and those which afford the broadest plain for cultivation. Only in few situations solitary fragments of Basaltes are observed, with rounded angles; the places where I passed the rivers of Progo and Bogowonto were at a considerable distance from the central ranges, but the beds were filled with volcanic stones carried down by the streamst.

Some peculiarities of the hills which compose the peninsula of Karang-bollong have already been mentioned in the journal: their direction is

from North to South, they terminate precipitously at the Ocean, and contain numerous perpendicular caverns. Having crossed the river of Chiching-goleng, the traveller meets at once the substance which forms the principal basis of these ridges; it is an aggregate rock, in its nature approaching most to that kind which is denominated by DeSassure *Poudingue*—Puddingstone—composed of fragments of various sizes, from very minute particles or grains of sand, to such as have six or more inches in diameter. They adhere very closely, but without any intervening cemen, in which they differ from the Amygdaloids of Werner, or from Porphyry to which, in other respects, they have great affinity. The constitution of this rock, one of the most common substances which forms the basis of the Island, is greatly diversified, and the following remarks apply only to the rock which composes this peninsula. It is found in some parts of the Island of a degree of compactness sufficient to enable it to take a polish and exhibits in other parts all the varieties of Volcanic or of Basaltic Tufa.

In the separate particles composing the aggregate rock in the ridges of Karang-bollong many of the varieties of Volcanic stone which are found on the Island, can be discoverd. The most universal is basaltes of various form, colour, size and composition; next to this are Lavas; some are made up chiefly of pumice, quartz and schorl, some can scarcely be distinguished from sand stone, in others numerous minute particles of schorl are bedded in white sand, which is agglutinated by means of a very pure white clay

in a state of partial decomposition. Green-stone, Hornblende and Osidian are also observed.

The external surface of this rock, especially where it is exposed to the action of water, is also greatly diversified, and often exhibits very grotesque figures: the minute particles of sand, &c. having gradually been carried away, the large fragments, projecting, form a very uneven surface. From the foot of the hill, at the common place of passing the Chiching-goleng, I traced it to the discharge of this river; here immense masses are heaped together, covering an extensive tract. At the termination of the hill several caves exist, and in one part a vault completely penetrates an extremity of one of the particular ridges. This is denominated Karang-bollong literally "*hollow rock*" and has given the name to the whole settlement. The vault here is very explanatory of the constitution of *the caverns in which the Edible Bird's-Nests are formed; on the whole it agrees with the rocks above described, but many of the separate fragments are of considerable size, exceding 6 or 8 inches in diameter: the largest of these are Basaltes. One of the Native chiefs, employed to superintend the collection of this production, accompanied me, and pointed out the similarity of Karang bollong, to the caverns in which the Bird's-Nests are constructed; this I afterwards had an opportunity of determining by personal observation. To the projecting fragments of the Pudding-stone the cords are attached, which support the ladders and bridges employed in gathering the nests, and on this the collector

* Exp. Cat. No. 5 and 6.

must rely: accidents however are very uncommon; and although the rock is liable to decomposition, scarcely an instance is recollected at this place of the separation of the stone to which the cord was fixed.

I collected explanatory specimens of this rock both at the river Chiching-goleng, and at the cavern Karang-bollong, and the peculiarities of each will be pointed out in the explanatory catalogue which is attached to this Essay In the ascent of this hill (the first ridge of the peninsula pointed out on the map) the base of Pudding-stone is coverd by a deep soil, consisting of a mixture of clay and mould of decomposed vegetables: on the summit I noticed, at a spot where a section of the hill had been exposed in forming the road, a deep stratum of stone which was a precipitate or deposite from water.* The materials were the same with those that form the Poudingue just described, but they were differently arranged; they exhibited plainly the appearance of having been suspended in water and afterwards united into various forms; in this place the layer which was exposed had been subjected to a current during the period that the present arrangement took place; fragments of various forms were hurled together, and the surface was covered with a friable earthy crust, indicating a greater degree of decomposition than appeared on the fracture; and the present arrangement must have taken place after the first deposition or the first agglutination of the minute particles.

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* Exp. Cat No. 7.

Of the fragments composing this stratum some were nodular, consisting of various concentric layers; some were tebular; others seperated readily into parallelopipeds, trapeziums or pyramids: in many casses large irregular masses were agglutinated without any shape. A similar deposition from water is one of the most common consituent parts of many of the separate hills composing the grand central ranges: those observed on this route will be pointed out in their proper places, with reference to the explanatory specimens. The fracture was yellowish, and exhibited clay in which minute particles of quartz, schorl, &c. were bedded.

In ascending the second longitudinal range of this peninsula, I observed a deep yellowish soil from which large framents of Basaltes projected; the hill is steep, and several hundred feet above the level of the Ocean. At the Southern extremity is one of the principal Caverns inhabited by the esculent swallow, denominated by the natives *Guwo-Dahar.* The descent to the shore almost perpendicular, is 72 fathoms: the stones which were brought up to me consisted of rounded fragment of Basaltes,* arising from the decomposition of the Poudingues; these had been collected at the entrance of the cave. The fragments of Basaltes on the summit, in this place, were mostly large; the surface was in a state of decomposition, and covered with a yellow friable earth. Some of the smaller fragments were nodular, and consisted of concentric layers. According to the account of the persons employed in collecting the nests, the Cavern extends with

* Exp. Cat. No. 2.

various windings about 200 fathoms into the body of the hill; the breadth is not considerable, the perpendicular depth is about 10 fathoms and the sides are completely steep. It consists exclusively of the Pudding-stone above described, to which the swallows attach their nests. Above this Cavern several considerably elevated points project from the numerous ridges forming this peninsula, of which an extensive view is here afforded: their particular distribution is very irregular, and although the general direction of the assemblage is from North to South, many of the intermediate ridges stretch across the vallies from East to West. *Karang-Kuda* of the natives, which rises a little South-West of the village of Karang bollong, is here the most conspicuous point. It is composed of calcareous *rock, containing various admixtures, and highly diversified in the composition: the foreign parts appear to be chiefly siliceous, and according to the account of the inhabitants, render it unfit for the preparation of lime for domestic purposes. The fracture of some exhibits small shells, others are of a coralline constitution, the nitrous a cid causes on all a strong effervescence. At the point where the eminence of Karang-Kuda is united to the ridge containing the Cavern above mentioned, an extensive groupe or assemblage of siliceous rocks is found, consisting principally of Hornstone, containing Hyalite and Agate, and often passing into Hornstone,† Porphyry and Flint. The external surface, projecting beyond the earth, is often discolored,

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* Exp. Cat. No. 3.

† Exp. Cat. No. 4.

appearing to be in a state of incipient decomposition. Some of the fragments partake of the nature of Hornblende, and these are also greatly diversified. This extensive groupe is in conjunction with the calcareous portion of the hill, the separate rocks penetrate deep into the earth; their relative position, in regard to the general Basis of this ridge, the Poudingue above described, I was not able to ascertain; but I afterwards fonnd the same minerals in other parts of these hills, and the extistence of extensive beds of siliceous stones, of almost every kind, in the grand central range and in the separate ridges deviating to the South, of which separate fragments are often carried down by the rivers, has been pointed out in the first section of the Mineralogical Essay.

The principal Cavern in the whole peninsula of Karang-bollong, is situated about one mile West of Guwo-dahar, in contact with the Ocean; from its size it is denominated *Guwogedé*, or the large Cavern: its height and transverse diameter are much greater than those of the Cavern abovementioned, but it does not extend so far into the hills. The perpendicular descent externally, from the eminence above the entrance at the ocean, is about 40 fathoms: its sides are also composed of rocks of Poudingue: several less considerable Caverns are found in the steep declivities towards the westward. Here I carefully noticed the termination of several ridges at the Ocean; they are perpendicular, or have a sudden inclination and the fragments of Basaltes, Sand, Lava and other volcanic materials are almost uniformly disposed in strata, the arrangement of which is more or less

perceptible. Westward of the large Cavern a considerable Bay exists in this part of the peninsula, called the bay of *Passir*; and the range is interrupted, in the north of the bay, by a sandy plain through which several villages are dispersed. From here I crossed the successive ridges towards the Western boundary, where likewise several extensive Caverns are situated on the Southern Ocean, the chief of which are those of *Nagassari* and *Jingkla*.

The constitution of all the successive ridges is similar to that of the first and second above described: in several places, where vertical sections of the hills were exposed, I noticed, stones of aqueous deposition, either in the place where they appear to have been formed, or carried by a current to a distance; the former separated spontaneously often from immense masses, of which entire ridges appear to be composed in the forms of cubes, rhombs, parallelopipeds &c. in the others fragments of various forms were jumbled together, and the surface was uniformly covered with a friable earthy powder. The soil is in general deep, and blocks of Basaltes project from it, or are rolled together in the beds of the rivers. Approaching the village of Nagassari, deep strata of clay of a reddish colour are exposed on the sides of the hills. Above the *cave* of Nagassari the hill is composed of calcareous rocks, distributed in irregular groupes, or piled upon each other in masses, rising many feet almost perpendicular. The sides are steep and regular, or rounded, cellular and excavated. The composition is*

* Exp. Cat. No 8.

more uniform than the Limestone of Karang-kuda, and the fracture exhibits numerous shells of various sizes; in some parts it is chrystallized and sparry: from this eminence the descent is on the whole gradual towards the Cavern of Nagassari: near the Ocean I found a vertical precipice of about 30 feet, to the rocks disposed near the entrance of the Cavern; this I descended on a common ladder of bambu. Here, on an extensive tract parallel to the ocean, immense rocks are scattered in every direction, resembling those of Karang-bollong: the entrance of the Cavern was distinctly observed about 20 feet lower, but at this time was inaccessible on account of the tempestuousness of the ocean, the surf beating against the rocks with great force: it was a simple fissure of about 10 feet perpendicular extent, gradually widening downwards.

A most extensive regularly perpendicular section of the hill was here exposed completely naked. The materials disposed in strata having a very gentle inclination, were similar to those composing the vault at Karang-bollong; Basaltes,* lava and sand, forming an aggregate rock of the nature of Poudingue; nuclei of white sand, schorl, and minute chrystals of quartz were sometimes discovered on the fracture. A considerable diversity existed in the form and colour of the Basaltic fragments, but they all exhibited the marks of having been carried by a current and of attrition. Many of the specimens here consisted of minute particles, greatly resembling the Basaltic Tufa, which I frequently found on

* Exp. Cat. No. 9.

the summits of the principal volcanoes, and of which the sides of the craters are chiefly composed.

The cave of Jingkla is situated near the South-west extremity of this Peninsula, in a ridge which is comparatively low, but terminates precipitously at the ocean and like the others appearing from above like irregular vaults penetrating the si es of the hill; these lead to a cavern less considerable than the others. In many other places which are here in view, the sides of the descending ridges are excavated to a considerable depth, where they are in contact with the Ocean. Near the shore I found detached *fragments of calcareous spar and of Hornstone mixed with the disintegrated parts of the poudingues Descending the most western ridge of this Peninsula, I passed an extensive tract covered with rocks of limestone; they are highly irregular on the surface, and deeply furrowed or excavated; in many parts large rugged rocks impede the road, and occupy a consid rable range at the foot of the hill in contact with the Ocean. In my return from the west rn declivities of this ridge I took a different route, and observed at intervals piles of limestone, poudingues entire or in a state of disintegrtion, fixed and rolled basaltic rocks, particularly in the basins of the rivers, and extensive beds of stones deposited from water.

The further remarks on the ridges which compose the Peninsula of Karang-bollong I shall suspend, till the other hills which have a similar constitution in the western portion of the Island,

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* Exp. Cat. No. 12 and 13.

have been described, and till the separate objects *of Lithology have been illustrated by the explanatory Catalogue: although the materials composing the grand central ridges and their branches are similar, it will be proper to follow them in the order of my route, and to point out the peculiarities which were observed. After leaving Karang-bollong, I proceeded closely along the eastern foot of the peninsula; at the village Adipollo the natives produced the stone which is employed in burning lime: it is a Stalactites of a loose cellular texture, formed in the numerous vallies of these ridges from the general mass of limestone, containing foreign admixtures: the latter, when exposed to a strong degree of heat, according to the account of the inhabitants, crumbles to pieces and affords a gritty mass, which cannot be employed for any of the purposes of lime.

In many parts of this route I noticed steep piles of calcareous rocks, and irregular masses were distributed along the foot of the hills; the surface was very rugged. Rounded fragments occasionally projected from a deep soil, and in one place I found hornstone similar to that of Karang Kuda. Great portion of this tract is inundated during the rainy season; and even in the middle of the dry season many spots, were marshy. The small tract of Ranka is situated towards the northern extremity of the ranges of Karang-bollong, and forms part of the extensive plain of Baggalen; in the north, the rising is scarcely perceptible; proceeding westward to the village of Selondokko, I passed the projec-

* Exp. Cat. No. 10 and 11.

tions of the numerous central ranges, and entered on an uneven tract: the ascent continues, with occasionally intervening vallies, to *Chelenan* the highest point on the large road to the capital of Banyu mas; several rivulets intersect the road, in the beds of which are rounded masses of Basaltes and Lava. The soil is deep, and on the whole fruitful. I found the various ranges which I afterwards crossed from the capital to the southern foot of Kali-weddi, on the route towards Talachap, of the same constitution. Upon the whole, great uniformity is observed in the central and transverse ranges of this part of the Island. On all the soil is deep; and extensive masses of stone, formed by a deposition from water, with fragments of Basaltes rounded by attrition, are observed in most of them.

The lower tract of Aya, which is bounded in the north by the projections of the ranges just described, and along the course of the southern shore by several ridges of low sand hills, is subject, during several months of the year, to the same inundation which takes place in the province of Baggalen eastward of the peninsula of Karang-bollong; but the greatest part of Aya is still in a state of nature, and its swamps are covered with impenetrable clusters of thorny-bambu (Pring-ori) various species of Erithrinaa, Mimosa, Ficus, Vitex, Eugenia, and other forest-trees, which from their distant situation are rarely applicable to any use.

From the southern declivities of the hills of Kali-weddi to the principal settlement of Aya (Adipollo, Adirijo, &c.) the road frequently meets the curves at the eastern banks of the large river of Serayu, the course of which is

now very slow; in the westward a range is perceived, which runs off, in a South-west direction, towards the Bay of Talachap. After crossing the river near its discharge, I proceeded nearly westward through a tract which is low and marshy: several bays and inlets introduce the water of the ocean, and it is covered abundantly with the common marine plants, viz: Rizophorae, Nipa, Hernandia, Tacca, &c.

This tract extends in the same direction to the district of Cheribon: several branches of the grand central ranges run here towards the shore, nearly from North to South, directing the course of the Rivers of Juruk-leggi, Chibrum, &c. as they arrive in the lower alluvial districts they send off many transverse branches, which serve as canals to introduce the sea water through this whole tract, and give that disposition to the soil which is favourable to the production of the marine plants above mentioned.

The Island called by the natives *Nuso-Brambang*, extending from about one mile eastward of Talachap to the discharge of the river Chipakkat, is separated only by a narrow strait from the low tract of the opposite Island. This strait communicates in the west with an extensive Bay denominated Segoro-Anakan, and affords a discharge to the water accumulated by the Rivers of Juruk-leggi, Chi-brum, &c.

Nuso-Brambang rises in this part almost precipitously from the Ocean: its constitution is of a mixed nature, bearing great resemblance to the hills which compose the central ranges I examined it in contact with the Ocean from the deserted village of Banjar, towards the eastern extremity: the points are mentioned on

the Map, and on most I collected explanatory specimens (See the Map.)

At Banjar I noticed in the pebbles on the shore the following peculiarities:

Firstly—small fragments of very dense Basaltes, of a blueish color, resembling touchstone:

* *Secondly*—pebbles, the basis of which was Hornblende, marked with numerous white lines, variously crossing each other, consisting of delicate laminæ of Feldspar, the lustre of which was lost by attrition; in some fragments, however, the laminæ were extensive and entire, and these, superficially viewed, resembled granite:

† *Thirdly*—a species of Sandstone which is peculiar to this part of the Island: the color is greenish, the grain very fine, and, in most of the fragments, a determinate form, consisting of four unequal sides, resembling exteriorly the common Basaltes of this neighbourhood, could be observed. Many fragments are cuboid, others rhomboid, &c. I am led to suppose that extensive beds of this stone enter into the composition of the hills in a western direction from hence: in the eastern ranges I have hitherto not observed it.

Fourthly—rounded fragments of Agate, Jasper, Hornstone, Porphyry and other siliceous stones.

In ascending the hill in this part, which rises nearly precipitously a few hundred yards from the shore, I found again numerous fragments of the greenish stone just mentioned: in the rivulets

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* Exp. Cat. No. 20.

† Exp. Cat. No. 17.

were detached basaltic fragments and rounded Poudingues of a close texture, consisting chiefly of Hornblende, in which were bedded nodules of Feldspar and Quartz: the basis of the hill it-* self, in this part, is a congeries of Basaltes, which are occasionally observed on the surface; this is covered with a deep black mould in which vegetation is very prolific. No great progress appears at any period to have been made in culture; since this neighbourhood has been disturbed by pirates, an entire desertion of the population has taken place, and the fruit trees remaining on the spots of the former villages and settlements, grow up promiscuously among the other trees of the forest. From Banjar I followed the shore to the principal points situated in the East: at *Karang pachi* (see the map) is a steep pile of calcareous rocks which extends, in different strate, a considerable distance along the shore: the surface is very† irregular, and marked with deep cylindrical excavations; the fracture is by no means uniform, and it appears to contain a considerable admixture of minute crystals of quartz. At *Ujung-agung*, which follows (a few hundred yards) further Eastward a different appearance is exhibited. A very extensive Groupe of Volcanic rocks, occupies a considerable extent of the coast declining gradually to the Ocean and then stretching to the Eastward; in the South it rises § precipitously to the range which here composes the Island: it is a genuine lave, exhibiting the

* Exp. Cat. No. 19.

† Exp Cat No. 21.

§ Exp. Cat. No. 18.

character of this stone on the surface as well as in the fracture; but it differs from the others hitherto observed on the present route, in evidently remaining on the spot where it was formed, being, on the whole, connected to one mass, not rounded on the surface, or exhibiting blunt angles, as those referred to in the preceding description, both such as were found in the beds of rivers, or dispersed among Basaltic rocks through the hills. It appears, in my opinion, to come near to that species of lava which is distinguished very properly by Sir G. *Mackenzie* (see Travels in Iceland) by the name of *Cavernous* lava: I soon met it again in investigating the Southern coast, and it afterwards occurred, both in exposed situations, where it is acted on by the Ocean and in the midst of the central ranges.

It has appeared of importance to point out those minerals which remain in their original situation, and define the extent of the volcanic chasm in the bowels of the earth, as in most parts of the Island, although consisting almost exclusively of volcanic materials, these have been removed from the place where they were formed, and have been arranged in strata, often probably, at a great distance from the spot where they were acted upon the subterraneous cause. The constitution of the entire series of the irregular central ranges, is a proof of this, and after this mineralogical sketch of the route, I shall endeavour to point out (with reference to the map) these points which remain in their original state, and those which have been arranged in strata.

The external surface of this lava is rugged and cellular, the excavations are deep, and often confined by a narrow corresponding margin; it has a particular disposition to burst into irregular, rhomboidal, oblong or cubical masses, some of which are very large: the fracture of separate particles is observed to be compact or finely vesicular, and contains much Feldspar and occasionally Zeolites. The whole groupe must be reckoned to the class of submarine lavas.

The appearance they exhibit to view is very striking; an extensive field in contact with the Ocean is here covered by rugged lava, and although the groupe is highly irregular, the disposition to separate into rhombs and cubes is distinctly observed in the larger masses, which in alternate projections contribute to form a very irregular scene.

From Ujung-agung towards the furthest North-East point, I noticed, in contact with the Ocean, only calcareous rocks, excepting the pebbles on the strand, which were similar to those * of Banjar: at Brambang the piles are very † precipitous and the strata inclining: towards Karang-bollong near the point mentioned) the surface of the rocks is very unequal, cellular, and excavated with cylindrical furrows. I refer for their particular description to the explanatory Catalogue, see No. 17 to 24.

From the river Serayu in a direction Eastward to the foot of the hill Badagangan, the tract is level, and at the present period (in contact

* Exp. Cat. No. 22.

† Exp. Cat. No. 23.

with the Ocean) in a state of cultivation: the soil is a mixture of clay and sand, and produces annually a plentiful crop of rice: Cacoa-nut trees are very abundant. The river Adirojo flows along the Western foot of the hill mentioned; at its banks are exposed in many points, piles of Sandstone of a texture more or less compact, and often of a stratified disposition, resembling the stone called *padas* in many parts * of the Island, and belonging to the class of volcanic Tufa: on the Eastern banks of the river it is in conjunction with the rock of which the hill Bedagangan is composed: this has the same direction as the ranges of Karang-bollong, extending through the Southern parts of the plain of Aya, directly North and South, without any connection with the central ranges; its base in the parts I examined, is composed of cavernous lava, of submarine origin, and of constitution very similar to that found at the point Ujung-agung on Nuso-brambang. In con- † tact with this I noticed Pudding-stone of the same kind as that of Karang-bollong. This hill terminates precipitously at the ocean, and contains here a fissure which is inhabited by the Hirundo esculenta. Near the discharge of the river Adirojo a large tract consists again of cavernous lava, compact in its fracture, but highly rugged and irregular in the external appearance. Here extensive groupes project at low water, presenting rocks of a dark color, cellular, and excavated in great variety of form §

* Exp. Cat. No. 25.

† Exp. Cat. No. 26.

§ Exp. Cat. No. 27.

The fracture resembles that of many of our Basaltes, but contains a greater admixture of Schorl. Some parts, in which Schorl equally abounds, are made up of a white fine-grained sand. Feldspar is comparatively rare. Eastward of this hill to the village of Jittis above mentioned, the tract near the Ocean is but sparingly cultivated; towards the North the whole is an inaccessible marsh, bounded by the central ranges; near the North East exremity of this, the village *Pling-tuttul* is situated, which has been mentioned in the Geographical description.

After the examination of the Southern portion of the province of Banyumas, my attention was directed to those districts which are situated North and North-West from the capital: these occupy a considerable part of the declivities of the mountain of Tagal, one of the principal links in the volcanic series of this Island. Having crossed the river of Serayu, and passed several eminences which are covered with a deep soil, I entered on a tract nearly level, having only a gradual ascent in the North; it is composed of the districts of Passir and Probolingo, being bounded in the East by Banjar, and in the North and West by several of the Honorable Company's districts belonging to the residencies of Tagal and Cheribon

Near Suko-rojo, the situation of which is marked on the map, a tract commences which is covered almost entirely by Tuff or Tufa, either united or in a state of disintegration, stretching about 12 miles to the Westward, till it meets the ridges extending from the declivities of the mountain of Tagal towards the Southern shore.*

* Exp. Cat. No. 28.

This Tufa is exposed in extensive stratified masses at the banks of the rivers and rivulets, which are filled with the separated fragments, mostly rounded by attrition: its texture is very loose, and the component parts, of minute fragments of basaltes, pumice, gravel and sand are distributed over the whole territory, and have probably given rise to the name of *Passir*, signifying sand or gravel, for the whole district. The proportion of clayey parts which were mixed with the Tufa have also accumulated in extensive masses, and contribute probably to the productiveness on account of which the soil of these districts, in many places, is celebrated.

Besides the rivulets near the villages of Bagor, Suko-rojo, Purwo kerto and Probolingo where it is very abundant, I noticed this Tufa, in a state of agglutination, in various other situations; it generally crumbles away on being taken up, but has also remained entire, covering large surfaces which resemble the more compact Pudding-stones of Karang-bollong, and resist the effect of the water flowing over them: but on the application of any force, as the stroke of a hammer, they instantly fall to pieces. The peculiarities in regard to other tufas of this Island, will be pointed out in the explanatory Catalogue.

In proceeding to the westward, the vicinity of a volcano in strongly indicated by the substances which have been carried down by the currents, in the rivers; the streams of *Banjaran* and *Logowok* in the rainy season are very considerable, and their basins in the dry season are filled * with fragments of lava, indicating apparently a

* Exp. Cat. No. 30.

* more recent origin than those which are found in the central ranges, in conjunction with the hills, formed by a deposition from water, and at a greater distance from either of the principal volcanic points which have lately been in action. It appears indeed probable that they were ejected by an eruption comparatively late, in as far as relates to the general arrangement of the strata of this Island: their character is different from those of Ujung-agung and Bedagangan above mentioned, which belong to the submarine lavas, and I shall soon point out the traces of a very extensive stream which flowed in a S. S. W. direction from the mountain. It has, however, appeared to me that the Tufa which principally composes this tract has a still more recent origin, and if many of the lavas must be considered to have been formed under the ocean, this tufa appears to be a mere mechanical agglutination of the substances of one of the later eruptions. Proceeding westwards from Purwo-korto I passed several of the projections from the central ranges, running out before the foot of the large mountain, and the indications of the Tufa were gradually lost. At Ajibarang the vicinity of an active volcano, already indicated by the detached fragments in the rivers of Banjaran and Lo-gowok, was more strongly exhibited: near the declivities of several of the ridges just mentioned, I traced, South of the chief village of this district, a stream of lava which appears to have flowed from the mountain in this direction: the vestiges of it covered an extensive tract in a de-

* Exp. Cat. No. 31.

clining situation, and extend to the rivers bounding it in the East and West: the lavas project in some parts in connected groupes, like rocks of granite from primitive mountains, or they are thrown together in detached fragments; the intervening spaces being covered with a deep vegetable mould: their surface is either smooth, like that of Basaltes, or cellular like scoriæ: * In the river *Datar*, which I followed several hundred yards through various windings and small cascades, I found an extensive channel of compact lava, consisting, in many places, of a vertical height of 30 feet.

Near its banks, an extensive fissure of one of † the ridges disclosed a cavity about 30 feet deep, consisting likewise of compact lava, separating spontaneously into large, more or less determinate blocks, often with regular sides, the surface of which is cellular, and in many instances of a reddish colour; the mass composing this eminence must be considered of anterior date, being covered by a thin stratum of rolled Basaltes of various sizes, mixed with sand and gravel. The stream in contact with this on the descent above mentioned, and probably also that which composes the basin of the river *Datar*, exhibited the appearances observed in our volcanoes after recent eruptions; separate disjointed blocks promiscuously thrown together, with adjoining groupes, more or less regular, approaching the nature of Basaltes, are often exhibited, as has been mentioned in another place.

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* Exp. Cat No. 33.

† Exp. Cat. No. 32.

The color is black or inclining to red, the fractory compact or vesicular; in the former various foreign admixtures are perceptible, which will be pointed out in the separate description; in the latter the concavities are often numerous and close: these resemble the lavas rolled from our craters by the most recent eruptions, in a semi-fluid state, partaking of the nature of slags: many of those in which the fracture was compact could scarcely be distinguished from the common Basaltes of this Island.

At the river Kawung, which flows near the Western boundary of this tract of lava, in a situation about two miles North, inclining to the West, of the groupe above mentioned, I observed the most regular assemblage of prismatic stones hitherto noticed in any part of this Island; the fragments appeared to remain in the spot where they had been formed, the angles were still regular and sharp, and the extremity projected in most cases towards the rivulet with very little inclination. The separate fragments were four sided, and the angles mostly regular; the whole groupe occupied a length of about 30 yards near the rivulet, and 5 or 6 fragments were piled almost perpendicularly on each other; in a few intances only, they presented the longest side. This assemblage was remarkable, as it exhibited the only prismatic stone (of the Trap family Basaltes) I had hitherto noticed in which the angles were *not* rounded by attrition or shewed the marks of having been carried by a current.

In the river Tiajum I found again, in a situation South-west of the village of Ajibarang, the indications of the extend of this tract of Lava; here the fragments were mostly separate

but of immense size, and strewed promiscuously in the basin of the river; they appeared to form in this point, the western boundary of the tract, which, beyond the river, was met again by a hill descending from the grand central ranges in this direction.

The western banks of the river were confined by several ridges of moderate elevation; at the spot which I examined, a pile, of a somewhat pyramidal form, rose precipitously to the height of several hundred feet: the side near the river was completely naked, and exhibited its internal constitution. At the base a rugged mass projected, which at a distance resembled Lava, but on near examination was found to be an aggregate rock of a grey color, consisting of sand,* calcareous spar, and clay in various proportions of admixture: extensive groupes of spar appeared on the surface and on the fragments which were broken off: detached masses of a similar rock were afterwards found on the opposite side of the river, which were more compact, and in the fracture resembled amygdaloids; † they consisted chiefly of nodules of clay, bedded in a sparry mass. Resting on the aggregate grey rock at the base, and composing the greatest part of this eminence, was an extensive assemblage consisting entirely of a deposition from water, of great variety of configuration and arrangement, but chiefly of lamina and nodules. The whole side of the hill which was exposed exhibited this deposition in a nodular or tabular form, in groupes alternating with or mixed

* Exp. Cat. No. 34.

† Exp. Cat. No. 37.

through each other without any determinate order: the separate fragments had rolled down, and were found at the banks of the river, and bold strata extended into it and formed part of its basin; the arrangement of the separate nodules was in concentric layers, but on being taken *up or removed from their original situation, they burst transversely and crumbled away in irregular concave lamina. The predominant color of the fracture was blueish-grey, externally most of the fragments were covered with a dirty yellowish ochreous crust: they slightly adhered to the tongue.

In attempting to ascend the hill, the various masses rolled under the foot and carried one back again; the top was covered with long grass. Some yards North of the groupe of grey rocks, at the base, in contact with the river, a mass was deposited which approached † the nature of sandstone: the portions which composed it had a disposition to separate in a more determinate angled manner, forming cuboid or trapizoid fragments, not unlike the configuration of many of our basaltes: the fracture was bluish and compact, and they were covered with a yellowish crust. A simple sandstone was also occasionally found in contact with the other assemblages forming this hill, resembling the grey rock at the base, but without any admixture of spar.

The district of Passir extends to that part of the foot of the mountain where the acclivity

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* Exp. Cat. No. 35.

† Exp. Cat. No. 36.

becomes more abrupt; here it is bounded in the North by the small tract of Kumutuk, beyond which, the South side of the mountain has not been examined: the territory also consists of * Tufa resembling that of Purwo-kerto, but from the natural inclination of the district, all the small and loose fragments have been washed down towards the southern valley. It is covered by a deep soil, accumulated chiefly from a very luxuriant vegetation during a long period. In some parts a lava is exposed in the rivulets resembling the more compact kinds of Aji-† barang.

The constitution of Probolingo resembles that of Passir; towards the eastern boundary the quantity of sand and gravel on the surface is less abundant, but at the banks of the river Kelawing, near the chief village of this district, immense piles of Tufa are exposed, often to the depth of 30 feet, which, as well as that found near Suko-rojo, has compactness enough to be cut into tables or slabs, and employed in flooring the dwellings of the natives and for various similar purposes. In the pebbles of this river, carried down by the current, I also noticed the indication of extensive beds of siliceous stones in the central ranges: with the common rounded fragments of Lava, Basaltes and Sand-stone, were mixed Agates of various kinds, Prase, simple Hornstone, Hornstone-porphyry of great variety of colour and fracture, and a species of § Sandstone of a verdigris-green colour, having

* Exp. Cat. No 41.

† Exd. Cat. No. 42.

§ Exp. Cat. No. 22.

a disposition to a regular angular form, like the fragments of green Sand stone found at Nuso-Brambang: in the fracture appear minute particles of varying shades of colour, consisting of * Horn-stone and other siliceous stones.

Between the mountain of Tagal in the West, and the Sundoro and Sumbing in the East, the body of the Island is occupied by various ridges, the direction of which on the whole is from East to West. From the vicinity of the Sundoro they take a northern direction, and from the mountain of Tagal they incline to the southern shore. These ridges consist of several irregular chains of hills, the particular stretch and distribution of which cannot easily be ascertained with accuracy, as they are connected by numerous transverse links. From the intervening declivities and vallies many separate mounds of an oblong or conical form arise, which are almost uniformly rounded on the surface and covered with a deep soil.

Almost in the middle of the Island a very extensive valley exists, affording a basin to the large river of Serayu, receiving from the North and South numerous streams flowing to this central excavation, from which, in both directions, the ascent is gradual, but considerable. The highest points in the North are the mountain Prow, and in the South the Kuripan or Gunung Iju, two very conspicuous points, from which the territory continues uneven to the northern and southern shore, consisting of numerous vallies and irregular ridges. The valley which transmits the river Serayu was in

* Exp. Cat. No. 23.

former times distinguished by the denomination of *Lurung-tengu* or the middle valley, a name which is sometimes applied to the whole province of Banyu-mas, and the adjoining districts in the centre of the Island: from the capital, the direction of the river is soon turned off towards the South, by the branches of the central ranges descending in this direction.

On leaving the capital of Banyu-mas, I first pursued the common road leading to the eastward, which in the lower parts of the valley runs nearly on a level with the Serayu; I met the curves of this river in various places: On this part, to Purwo-ro'o, I observed on the projections from the central ranges which I crossed, extensive masses of a deposite from water, similar to that above described, Basaltic rocks, with angles rounded by attrition, rising from a deep reddish soil, and in the beds of the rivers of Piosso, Deris and Sapi, fragments of Basaltes and Lava; some of the latter were very cellular, and resembled those of the acclivity of the mountain abovementioned. At Purwo-rejo I could take into one point of view the first range of central hills, rising to the North of the valley of the Serayu, at the distance of about 8 miles: these are mostly long extended eminences, similar in their appearance to those stretching from Rangka to Kali-weddi, and indicating, at a distance, the same constitution: disposed among the extended ranges were observed precipitous piles, rising in many cases almost perpendicular, the nature of which is in a great measure elucidated by the hill Lawet, to be mentioned in the sequel: the elevation of all these, in comparison with the large mountain of

Tagal, the Sundoro and the Sumbing, is not considerable: these their principal volcanic points could here be taken into view at once.

On the track from Purwo-rejo to Gomuro, the numerous terminations of the descending ridges alternate with leved districts: they are all covered with a deep reddish soil or with vegetable mould: on proceeding to the eastward, the declivities which form the valley of the Serayu come nearer to each other. Between Gomuru and Kutto-waringin, I crossed this river about a mile below the entrance of the river Merawu, which descends with a rapid stream, in order to examine the principal of the northern eminences of the central ranges. At this point an extensive stratum of Pudding-stone is exposed at the banks, which is either compact, like that of Karang-bollong, or loose and friable, like the Tufa of Suko-rojo. Several of the separate fragments which I detached with some difficulty, resemble greatly the *common Hornblende* of Werner, although they must be classed with our Basaltes. This as well as the two specimens of aggregate rock * are decscribed in the explanatory Catalogue.

Of the rounded pebbles collected in the bed of the Serayu, the most remarkable were a compact Pudding-stone, apparently brought by the current from a distant situation, and a peculiar stone (of the Floetz-trap formation of Werne) resembling Wacke, of an obscure blueish grey color, traversed with white lines of various breadth from that of a hair to half an inch: Their direction is curved or undulating, and

* Exp. Cat. No. 45.

rarely regular, in some instances however they cross each other at right angles. The number of these lines is various; in some fragments a single streak was observed, in others the whole surface was variegated: they consisted chiefly of calcareous spar, as appeared by the application of an acid: the surface of all the fragments * was strongly rounded by attrition. The fragments † of Basaltes found in the river, were of different constitution, and indicated a derivation from different original situations: in some, small crystals of schorl formed a chief component part, others consisted, in great part, of minute groupes of Feldspar.

From *Banjar* I pursued my route in a Northern direction: this village is situated on the stream Merawu, about 2 miles above its discharge into the Serayu. Several very considerable points of the central ranges fall in the route I had proposed; they will be enumerated in the order I met them; but for their relative situation I must refer to the map which accompanies this Essay. The first is the hill *Pawinian*, which lies nearly North of the village of Banjar. The road traverses the Eastern declivities: these are divided by several deep ravines which are covered with a fertile black mould; in the vallies rounded fragments of basaltes are accumulated.

Almost directly East of the highest point of this hill, the steen pile, called *Gunung-Lawet* by the natives, is situated, which by its precipitous elevation attracts considerable notice at a

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* Exp. Cat. No. 43.

† Exp. Cat. No. 44.

distance: as the road passes between the two hills, I had a good opportunity of examining it with care. When observed a far off, it appears to consist of several massive rocks which rise almost perpendicular from an extensive base: the Southern side appears cragged and broken, the Northern has a gradual inclination. The steepst parts are naked, the foot and severa- spots on the declivities are covered with shrubl and plants.

After a gradual ascent through a narrow pas sage or ravine, between the two hills, which is strewed with the detached fragments composing the Lawet, while the sides expose the same fragments closely arranged on each other, I reached the base of the Western pile. Here (in the South where I first examined it) it rises several hundred feet perpendicularly, being composed throughout of an assemblage of Basaltes. The form of the separate fragments is on the whole regular, consisting of prismatical masses, with defined angles: of considerable size. Some fragments had oblique angles, constituting rhomboids, pyramids, &c. with these regular prismatic or rhomboidal fragments, alternated in many places nodules of the same substance consisting of concentric layers.

The aggregate of the various masses on this side, constituted a stupendous wall, the component particles of which, more or less regular in themselves. were irregularly piled on each other, the alternate portions projecting and retiring from a perpendicular line.

The largest fragments, like many other besaltes, are marked with horizontal lines, indicating a further disposition to separate in a

manner similar to the fragments already detached: many of these are regularly tabular. The extent and boldness of this pile forms an interesting spectacle, of which it is difficult by description alone to give an adequate representation; it explains at the same time the constitution of the other perpendicular piles which are dispersed through the central ranges, and by their contrast with the rounded or extended ridges, attract the attention of the mineralogist. The Basaltes at the foot of this pile has a similar form, but the angles which project from the soil are blunt and rounded by attrition, shewing, as it were, the effect of substances which have been carried over them by a current.

On the fracture a grey or whitish color predominates, in consequence of the abundance of particles of feldspar and quartz, which enter * into its composition; through these are dispersed numerous crystals of schorl, hornblende and some times Augit. These also appear on the surface, which more than other Basaltes of this Island, inclines to a white color. Observed at a distance, this hill may easily be mistaken for an assemblage of calcareous rock.

The northern side of the western pile constituting the Gunung Lawet is much more uniform; it rises nearly perpendicularly, with very slight inclination, and no distinct separation into portions or fragments is perceptible: it exhibits the appearance of a stupendous wall of whitish colour, variegated only by a few excavations, apparently of later date, and (by no means numerous) longitudinal lines.

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* Exp. Cat. No. 46.

On the further route between the Gunung Lawet in the East, and the hill Pawinian in the West, I noticed numerous fragments accidentally detached from this pile: they were remarkable on account of the regularity of their form, which was mostly tabular, the angles were defined and still entire, bearing no marks of external attrition. Here I also found several other substances (of the same Floetz trap formation according to Werner), but apparently of a more recent deposition: the most interesting * were several varieties of Sand-stone, one of which consisted of small uniform Lamina, about a line in thickness regularly imposed on each other, with defined sides and angles: in a second the fracture was uniform (like common Sand-stone) and the separate fragments appeared in rhomboidal and trapezoidal masses.

After passing the ravine between the mountains Pawinian and Lawet, a considerable prospect is afforded of the adjacent country in the North the hill *Telogo-leli* is the second point, in this part of the central ranges, deserving notice on account of its elevation; at the foot of it the river Uren is observed winding in a deep stoney valley; numerous small hills, irregularly scatterred, are observed in this tract, rounded on the surface and covered with a deep soil. The road now took a western direction, following for several miles the northern declivities of the hill Pawinian, which here is chiefly formed of a deposition from water, in many places concealed by a deep earth or by a vegetable mould, in

* Exp. Cat. No. 47.

others it is bare and appears on the surface; its constitution agrees with that above described, composing a steep hill South of Ajibarang on the banks of the river Tiajum, but it is disposed in layers which have a gentle inclination and apparently penetrate far into the body of the hill. Externally of these layers the various substances which form the base of the surrounding tract, are irregularly mixed together: among these were likewise fragments of volcanic Tufa, which I soon met in extensive piles. Some of this was coloured by iron (vide Sp. No. 49). The most remarkable rocky substances entering into the composition of this part of the Pawinian *hill were; 1: a sand-stone separating into rhomboidal and trapezoidal fragments, with angles mostly defined; some portions are lamellar and penetrated by and ochreous efflorescence; 2, a massive precipitation in which no regular form could be observed, consisting of clay, and separating like coagula of that earth, when dry, into various amorphous particles. The colour was grey of a blackish hue, and it adhered slightly to the tongue.

At the Western extremity of the mount Pawinian the road again takes a Northern direction towards the eminence of *Paggar-pella:* the surface is uneven, and occasionally exposes the continuation of the strata which abound in the whole tract. The principal village of this neighbourhood, is also distinguished by the name of Pagger-pella and situated near the top of this eminence; the ascent, from the South, is strewed with numerous tabular fragments of Ba-

* Exp. Cat. No. 48.

saltes: in the descent, in the opposite direction, the road was cut through a deep stratum of this * stone in a state of decomposition. Its hardness and adhesion was so completely destroyed, that it was as easily divided by a cutting instrument as a mass of clay or earth: if taken up by the hand it crumbled to pieces. The fracture resembled that of the Basaltes composing the pile of Gunung-Lawek: the white colour predominated, the lustre of the feldspar was lost, and the other component parts were eathy and ochreous: in some particles the angular form was still discernible in others the whole was united into one uniform mass. This decomposed Basaltes was afterwards found abundantly in the central ranges, where it constitutes one of the pricipal bases of our hills: the causes which have effected or influenced this decomposition. have heen peculiarly operative in certain tracts and situations Many of the fragments above this decomposed stratum were very compact, and resembled the Wernerian Greenstone, consisting of minute irregular particles of feldspar and † greenish hornblende, intimately mixed: among these I selected specimens of very determinate sides and angles: in the village of Paggerpella several very large rocks of this substance projected from the soil.

On the descent abovementioned a third point of considerable elevation is first observed in coming from the South, the hill *Roggo-jambangan*. exceeding in extent of base, and probably in height both the Pawinian and Telogo-leli. At

* Exp. Cat. No. 50.

† Exp. Cat. No. 51.

the Northern declivities is a nearly extinct volcanic crater, forming one of a series in this part of the Island which will be mentioned in the sequel. At the foot of the hill of Pagger-pella I crossed the river Urang: the fixed rocks near the banks are Pudding-stone and Basaltes; the pebbles in the basin are very much diversified; I selected the following, all evidently derived from a distant situation in the central ranges: viz:

1. *Lava of entirely vesicular constitution.

2. †Lava of the kind of sub marine lava above mentioned, containing calcareous spar in narrow layers or irregular masses.

3. ††Compact clay in tabular fragments, the angles of which are rounded by attrition.

4. †‡Compact Pudding-stone (or Amygdaloid) consisting of minute fragments of Basaltes bedded in a clayey cement.

5. §Sandstone in curved and recti-linear layers.

6. §§Petrified wood with stony concretions.

The territory between the three principal hills of this part of the central ranges, the Pawinian, Telogo-leli and Roggo-jambangan, is covered by numerous inequalities irregularly dispersed, of which several deserve the name of hills: on the ascent of the ridge called *Sari* I met again stones of watery deposition. The village of *Karang-kobar*, the chief of the district of the

* Exp. Cat. No. 52.

† Exp. Cat. No. 52*b*.

†† Exp. Cat. No 53.

†‡ Exp. Cat. No. 54.

§§ Exp. Cat. No 55.

§ Exp. Cat. No. 53*b*.

same name, in a direction nearly E. N. E. of Pagger pella, is situated in a concavity surrounded by low mounds with obtuse summits, by which the prospect is much confined. They are all covered by a deep reddish soil. Proceeding in a North East course I found again an extensive section of a hill, composed entirely of the same substances which form the principal bulk of the stratified points at Ajibarang and the Pawinian, being a pile of clay and Sandstone, in various modifications, and separating spontaneously into prismatical, rhomboidal and trapezoidal fragments, between which nodules consisting of concentric layers, formed of the same materials, and covered with an earthy * efflorescence, were thrust in. Traversing these hills in the direction above mentioned, after leaving the environs of Karang-kobar, I noticed in several spots, extensive beds and masses of Basaltes in a state of entire decomposition, resembling those of Paggar-pella; and in the further progress, the basaltic rocks, which projected from a deep yellow soil, were much rounded at the angles by attrition.

Among the hills on the route to Kali-lunyar and in the environs of that village, are several elevated points projecting from the neighbouring unequal territory (which are marked on the map) namely, the hills Krangeang. Gaja and Lumbung, besides others of less note. The constitution of these is elucidated by the appearances I noticed in a valley near this village: here the depositions from water were very abundant, they extended almost perpendicularly

* Exp. Cat. No. 56.

or with very sudden inclination into the body of the hills The substance of which they were composed was almost pure sand of a coarse *grain, or fine sand and clay in nearly equal proportions; the latter was often of reddish color. The arrangement of these substances was either lamellar or nodular in concentric layers: these occurred alternating with each other; but from the appearance of their relative arrangement they had remained at rest from the period of their first precipitation.

From the valley of the river Serayu to the ranges in the vicinity of Batur, the ascent is gradual but constant, and only interrupted by occasional ravines and vallies: this is strongly indicated by the vegetable productions; I shall only adduce one instance; at Karang-kobar although the Cacao nut tree bears fruit, its productiveness is comparatively very scanty; at Kali-lunyar the tree vegetates without producing fruit; beyond this village to Batur no Cacao-nut trees are found, as they cannot support the climate of this elevated situation. The district between Nusupan and Batur affords a continuation of the appearances already described on this route: stones of watery deposition are often exposed by the sections of the hills;† the soil is deep and of a reddish color, the fragments of Basaltes which are occasionally strewed on the surface are strongly rounded at the § angles, and extensive masses of this substance

* Exp. Cat. No. 57.

† Exp. Cat. No. 59.

§ Exp. Cat. No. 58.

occur in a state of decomposition, forming in *some instances the base of entire ridges.

Batur is situated on the South-west declivities of the highest series, extending from the western foot of the mount Roggo-jambangan to the eastern extremity of the mountain Prow: the most interesting points of these ridges, in a direction from west to east, are the hills Butak, Piarangan, Pakermar, Nagassari, Koppok, Wismo, which deviates towards the south, and Diyeng and Telogo-Jebong, deviating towards the north. The assemblage of the Koppo, Diyeng and Tologo-jebong, with several other points, is denominated *Gunung-Prow*, from the appearance it exhibits at a distance: it projects considerably beyond the other points of this ridge.

According to a probable estimate, the elevation of Batur is equal to that of Selo on the Marbabu: this estimate is founded on the comparison of the vegetables growing in both situations, and on the temperature indicated by the thermometer: I found it on the 24th of October at Sun-rise at 53 of Fahrenheit's scale. The territory in the south is open, and exhibits an irregular succession of ridges, gradually descending to the valley of the Serayu, but without any uniform direction. Several long-extended ridges, with occasional bluff points, irregularly scattered, project more than others, they all indicate externally a formation and composition similar to these hitherto traced from Banjar to Batur. In the north of this village, the nearest point, the hill *Piarangan* rises, about

* Exp. Cat No. 60.

half a mile distant, with a precipitous elevation. I ascended it, and estimate its elevation at least 1000 feet above the surrounding level; it is covered with a deep soil and highly luxuriant vegetation: Basaltic stones in extensive layers are occasionally observed on the ascent projecting from a deep soil: their surface is burst and covered with an earthy ochreous incrustation.* Several detached fragments have a reddish color, and indicate the existence of beds of decomposed Basaltes near the foot of this hill.

The hill *Butak*, (which name, according to the application of the natives, includes the assemblage of all the ridges situated immediately North and North West of Batur) is connected, in the North-West, to the declivities of the hill Prarangan, and in the east they pass into the *Pakerman* This mountain is well known on account of the volcanic apertures which exist in its declivities: one of these is denominated *Guwo-upas* or the *Poison-cave*, by the natives, in consequence of the deleterious effect of the air it discharges on the animals that approach it, the other, the crater or *Kawa* of the natives, lies at the Western foot of the mountain, and explodes, at intervals of a few seconds, considerable volumes of smoke. The diameter of this opening is about 30 feet and its depth is considerable; near it is a smaller one about two yards wide. The natives have a superstitious aversion to approach these apertures, and I yielded to their sollicitations, at the sacrifice of the curiosity to examine their appearance: this was of less importance, as frequent opportunities occur of observing similar outlets.

* Exp. Cat. No. 67.

This neighbourhood was convulsed by the operation of a subterraneous combustion about the year 1786: after an earthquake which continued, at intervals, for the period of four months, an eruption forced its way not only through the existing volcanic apertures, above mentioned, but through the neighbouring territory to the extent of two miles in diameter. Various rents were formed which emitted a sulphureous vapour, separate tracts sunk away and were swallowed up by the earth; in one of these the waters of the rivulet *Dolog* entered and afterwards followed a subterraneous course. The sulphureous vapours were observed in the atmosphere four successive days. The village of Jampang, at the confines of this convulsed tract, was likewise buried in the ground, and the inhabitants who had not timely left their dwellings perished: several persons were killed by the materials ejected from various openings. The aggregate number of persons who lost their lives on this occasion, most of whom were females, is estimated at 38. This information was communicated to me on the spot, by two of the principal Demangs (or chiefs of villages) of the Karang-kobar district, both natives of respectability, one of whom personally witnessed the event. At the present period the effects are nearly obliterated, the sides of the excavations being covered by a profuse vegetation. I noticed the remaining concavities, and visited that in which the revulet Dolog sinks away. The water first accumulates in the remaining basin, which is about 30 feet broad, at the foot of a steep eminence, surrounded by large rocks of

Basaltes, and then almost insensiby filtrates into the earth. During the rainy season, when the water is increased by a strong afflux from the hills, a portion still follows the original bed of the rivulet. On the site of the village Jampang I observed a moderate excavation: it is deserted, and the remaining inhabitants have fixed themselves at *Kassiran* a village near the road leading from Batur towards Kadu.

Near the southern diclivities of the mountain Pakerman, the mountain *Nagassari* is situated, stretching considerably to the South, and still further, in this derection, inclining gradually to the eastward, the mountain *Wismo*. The extent and elevation of the latter is more considerable than that of the Pakerman, Nagassari and the others of this range, all united at the base, and forming an assemblage, possessing separately almost the same degree of elevation: Their external appearance is likewise similar, they constitute somewhat extended ridges and the sides are excavated by deep ravines.

In various excursions through the declivities of the hills of Prarangen, Pakerman and Nagassari, I selected explanatory mineralogical specimens; the most interesting were:

1. Compact lava of a bluish color.

*2. Porous or cellular lava (emitting when struck the sound of bricks) of a red colour: of this several varieties are found in different situation; on the whole the color abounds in this district, both in the lavas and in the soil.

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* Exp. Cat. No. 62, 63, 64, 65 and 66.

*3. Compact Basaltes with determinate angles.

4. Several varieties of Basaltes in a state of decomposition, of which extensive beds are found in the vicinity.

In the route eastward from Batur, I first followed the Southern foot of the Pakerman and Nagassari; the road subsequently winds to the North between this hill and the mount Wismo and gradually ascends. On this track I passed the rivulet *Pul* and the remnant of the rivulet *Dolog*, and observed, very distinctly, the explosions of the Crater of the Pakerman appearing regularly after an interval of a few seconds.

Having passed the Eastern declivities of the hill Nagassari, the road approaches the hill Koppok, which conceals the Eastern points of this range. In proportion to the elevation of the district and the vicinity of the summits of the hills, the ravines become deeper and the ascent more abrupt. The river *Tulis* which after receiving the rivulets of Puti and Dolog, pursues a Southern course, and forms one of the principal branches of the Serayu, winds through a very deep valley on the sides of which basaltic rocks are exposed: these are observed in large masses, forming extensive piles on the acclivities further eastward; their angles are all rounded by attrition. The elevation is now apparently about 1000 feet above the level of Batur, in as far as it is indicated by the vegetable productions: very few of those growing in the lower parts of the valley of the Serayu are now met with, but Casuarina *Chomoro* is here the

* Exp Cat. No, 61.

most common tree: the trunk is abundantly covered with various kinds of moss, resembling that of the Northern countries of Europe: many species of Epidendrum, of Lycopodium, &c. commonly found in colder climates, are suspended from the branches. The number of rare Ferns is also considerable.

*The territory near the summit of this connected ridge, is covered with a reddish soil, mixed, near the surface, with black vegetable mould. The village of Konang is situated in a slight concavity, surrounded on all sides by several narrow ridges, descending from the mount Diyeng, and inclining towards the mount Wismo; the principal of these, in the South, is the Wagertipis. In the North of this village, on the descent of the mount *Diyeng*, another volcanic opening exist, which, like that of the Pakerman, emits smoke at intervals. On this elevated tract, covered with a highly fertile soil, vegetation is very luxuriant; several plants are spontaneously produced, which in general, are considered as the exclusive inhabitants of colder climates.

On the descent of the hill *Telogo-jebong* (the denomination which is here univormly given to the Southern declivities of the mountain Prow) I noticed lava, basaltes and pudding stones alternating with each other, and recurring at intervals without any determinate disposition. Both the lava and basaltes have been employed in the construction of an artificial stair, which extends through the greatest part of the

* Exp. Cat. No 68.

descent of this mountain, and which constitutes one of the most stupendous vestiges of the ancient inhabitans of this Island; in a fragment of one of the slabs of which the stair is constructed, among the explanatory specimens annexed to this Essay, the fracture exhibits various foraminula filled with a white siliceous stalactitical substance, the rest is composed of quartz and hornblende, through which mica is *sparingly dispersed. This mountain, as well as the Diyeng, contains several extinct volcanic apertures which at the present period are filled with water, and constitute „*Telogos*" or lakes according to the denomination of the natives. From the *Telogo-jebung* the whole mountain has been named; at the foot I observed the *Telogo-menjer* near a village of the same name. The descent of the mountain to the village *Kayu-Rangkang*, near the lakes last mentioned, is very sudden, and the perpendicular elevation from here to the summit is at least 1500 feet.

From the village *Kayu-Rangkang* to the river Serayu, which I crossed near the Chinese farm of Jawar, the descent is gradual, and only interrupted by the ravines descending from the neighbouring mountains, and meeting each other from various directions. The Serayu flows with a rapid current from north to south, arising from the hill Jajar, near the Eastern declivities of the moutain Prow: its basin is strewed with large rocks of Basaltes.

On the route from *Kayu-Rangkang* towards the south, I observed on the sections of the hills that were accidentally exposed, Tufa of various

* Exp. Cat. No. 79.

constitution: it was often arranged in strata, and resembled a coarse sandstone, but its adhesion was generally so slight, that it crumbled to pieces if removed from its original situation; in some instances, however, it was compact.

The village of Kali-Bebber is situated about eight miles south of Kayu-Rangkang, in a tract which gradually declines towards the central valley, the direction of which, in this part of the Island, is nearly from east to west. The river Serayu (not far from its source) flows towards it from the north; the river *Begalu* from the east; besides these many smaller streams from the neighbouring mountains direct their course towards it, and contribute to one of the principal rivers of the Island, which has already frequently been mentioned in the preceding Essay.

Not far from Kali-Bebber the territory sensibly rises in the north-east towards the mountain Sundoro, one of the principal points of the great volcanic series, which indicates at present the continuance of the subterraneous combustion, by occasional discharges of smoke and flame, and the appearrances in the vicinity afford the strongest marks of former eruptions of a more formidable kind. Besides rocks of very considerable bulk and extent projecting from the soil, the surrounding territory is covered with smaller fragments of basaltes, which appear to have been carried down from the steep sides of the mountain, and to have accumulated in the districts of more gradual inclination. The size of these fragments is very various; in general they have a trapezoidal form, and a diameter of 6 or 8 inches. They are abundantly dispersed over the ground which is in a state of culture,

and the natives here uniformly employ them for inclosing their villages, gardens, &c. &c. Their fracture and composition is similar to that of many other basaltes found near our principal *volcanoes. With these lava is found, in many situations; it is almust generally exposed in the beds and at the banks of the rivulets, either in solitary rocks or in collected groupes; it resembles the recent lava found in other parts of this Island; the color is black, the fracture vesicular, or similar to slags, and it emits when struk, the sound of brick. Lava of the same † kind was found, on my further route, at intervals in every part of the environs of this mountain, and has probably been ejected from the crater, like most of our recent lavas, in masses, which having congealed near the summit, rolled to the declivities in solid slaggy fragments. The elevation of the environs of the village of Kali-Bebber is still considerable—I observed the Thermometer on the morning of the 29th October at 68 degrees of Fahrenheit's scale.

From here I proceeded in a southern direction continually towards the central valley. In the numerous ravines descending from the sides of the mountain Sundoro, which I crossed on the way to Kerteg, and consequently eastward to the valley which unites this mountain to that of Sumbing, I noticed similar appearances. Besides the basaltic fragments which lay loose in large numbers at the bottom, their sides exposed deep layers of Pudding-stone of a com-

* Exp. Cat. No. 69.

† Exp. Cat. No. 71.

pact texture, and of Tufa. They were both found solitary or in alternate strata. In a superior situation, and mixed with the detached fragments of Basaltes, the slaggy lava, above *mentioned, frequently occurred.

On the descent towards Kerteg, I regarded at a distance the continuation of the numerous ridges stretching from the highest point of the range towards the central valley: they agree generally in form with those above described to the south of Batur, following aggregately a direction from North-east to South-west.

South of the central valley the ridges rise again to a considerable elevation. One very conspicuous point is here observed, denominated *Gunung Koripan*, or *Damak yu* by the natives: it has already been mentioned above, as constituting in the south the highest point, in opposition to Gunung Prow in the north. The districts of *Gowong* and *Selo mâne*, and the southern portions of *Ledog*, which compose this part of the tract bounding the central valley, consist of an assemblage of ridges pursuing a direction from east to west; in the vicinity of Kerteg several separate hills are scattered, without any regular disposition. The constitution of these is explained in a great measure by that of the ravines on this route. Rounded Basal†tes, Pudding-stones and Tufa are strewed promiscuosly, or arranged in strata. The stream of *Begalo* is here discerned, arriving from the western declivities of the mountain Sumbing, to meet the Serayu about 9 miles to the westward.

* Exp. Cat. No. 71 and 72.

† Exp. Cat. No. 74.

From Kerteg the territory gradually ascends *towards the village of Rejo, situated at the western extremity of the valley, by which the mountains Sundoro and Sumbing are united: it is formed by the declivities of both passing into each other, and affords a very convenient passage between these mountains, whose summits are separated only 10 miles; the situation of the Sumbing inclines from the Sundoro towards the South-east. No traces of a very recent eruption can be perceived on either at the present period; they are completely covered with vegetation, and their sides are excavated by deep ravines.

Of these two volcanoes the Sumbing has been the longest at rest. On leaving the valley an † extensive propect opens in the eastward, and the volcanoes of Ungarang, of Marbabu and Marapi come successively into view, beyond and intervening tract of about 20 miles, the appearance of which produces a most striking effect on the attentive traveller. No part of the Island, perhaps, affords, at one glance, a more extensive district covered uniformly by that species of hills, the form of which explains in a great measure their origin and ancient situation: here a numerous assemblage is dispersed over an extensive country, the base of which has nearly the same level. The elevation of the separate hills is not considerable; they are in most cases conical or oblong, and rounded or blunt above. To a person arriving from the westward, this as-

* Exp. Cat. No. 73 Lava on this route.

† Exp. Cat. No. 76 Lava from the Mountain Sumbing.

semblage exhibits an appearance not unlike the ocean in a violent state of agitation. The northern hills appear to form a connected ridge, stretching along the horizon, from the foot of the mountain of Ungarang towards the declivities of the mountain Prow. Their constitution is already explained by the description of the various central ranges on the preceding route; they are composed of the same materials; basaltes abounds in all, bearing uniformly strong marks of attrition, as well in those fragments which remain on the declivities, as in those that have been carried down to the vallies and to the basins of the rivers and rivulets. In the vicinity of the Sundoro and Sumbing large fixed rocks project from the soil, and the detached fragments are very numerous; towards the eastern volcanoes the territory is covered, more deeply, by a reddish soil, and the basaltes in many cases exposed by sections of the hills, *indicates an incipient decomposition. Here some large rocks of this substance were also found, composed of particles which separated into tables or slabs on the application of external force: they were often marked on the surface † with parallel transverse lines.

The principal river pervading this territory, the *Progo*, arises from the norhern declivites of the Sundoro, and, after receiving numerous branches from this mountain, the Sumbing, and the declivites of the mountain Ungarang, flows in a nearly direct southern course towards the ocean: the most considerable of its eastern bran-

* Exp. Cat No 77.

† Exp. Cat No. 75.

ches is the river *Ello:* both streams retain for a considerable distance, a parallel course through an extensive basin (between the western and eastern series of volcanoes of this part of the Island) which conducts them to the south.

The district just described, composed chiefly of irregular hills with intervening plains of no great extent, forms a large part of the province of Kadu: its elevation is considerable, and the temperature is favourably influenced by the vicinity of several of the largest mountains of the Island: in the west it consists of the declivities of the Sundoro and Sumbing, in the east of those of the mountain of Ungarang, of Marbabu and Marapi. Numerous rivulets and rivers arising from these afford it a very abundant supply of water.

Besides the common grains, rice, indian corn, &c. which are largely produced, the territory is peculiarly favourable to the cultivation of various other vegetables requiring a moist and elevated soil—the *Tobacco* is superior in quality to that of every other part of Java. The *horses* of the Kadu are well known: besides their other qualities, being bred on a stony tract, their hoofs possess, in general, a degree of soundness and toughness which renders them useful in travelling over stony roads.

Immediately beyond the basin of the river Ello, the territory ascends again towards the mountain of Marbabu, which constitutes the centre of the transverse series of volcanoes, consisting of the mountains of Ungarang, Marbabu and Marapi, to the east of the Basin of the Progo; the description of these is comprised in the continuation of the general mineralogical Essay.

CATALOGUE

Of Explanatory Specimens.

No.

1. Pebbles, from the river Progo, near Brossot.
2. Basaltic fragments, from the shore at the Cavern called Guwo-Dahar.
3. Calcareous rock, denominated Batu-churi by the natives, from the eminence above the Guwo-Dahar.
4. Hornstone-rock, from the eminence above Guwo-Duhar, called Karang-Kuda.
5. Pudding-stone, from the cavern of Karang-bollong, near the extremity of the hill, at the discharge of the river Chiching-goleng, from which the village and settlement has derived its name
6. Fragments of Basaltes, from the same.
7. Stone of watery deposition, lamellar, nodular, &c. from the eminence between the discharge of the river Chiching-goleng and the village Karang-bollong.
8. Calcareous stone, found in large piles on the hill above Guwo-Nagassari.
9. Pudding-stones, from the entrance of the cave of Nagassari near the ocean.
10. White, friable, semi-decomposed lava (denominated *Padas* by the natives, belonging to the substance named *Tufa*) found copiously on the hills on the route from Karang-bollong to Jittis: (similar to No. 7.
11. Same substance (No. 10) more compact, forming Sand-stone found on the same route.
12. Hornstone porphyry, from the shore near Jingkla.

13. Calcareous spar, from the same place.
14. Black sand, from the beach opposite the discharge of the river Aya
15. Pudding-stone from the foot of the hill near the place of passing the river Chichinggoleng, on the road to the village of Karang-bollong
16. Stalactitic calcareous stone, from Rangka, employed in burning lime at Karang-bollong and neighbourhood.
17. Trapezoidal stone, of a greenish colour, the fracture resembling Sand-stone.
From Nuso-Brambang.
18. Cavernous lava, from Ujung agung on Nuso Brambang.
19. Pudding stone, from the same.
20. Rounded pebbles, from the shore near the deserted villages of Banjar and Brambang on the same.
21. Calcareous rock, from the point Tanjung Karang-pachi; from the same.
22. Calcareous roch, in extentive horizontal strata near Brambang, from the same.
23 Calcareous stone, from the foot of the hill near Karang-bolo, from the same.
24. Basaltic stones, from a rivulet near the village Brambang from the same.
25. Sand-stone, from an extensive stratum at the banks of the river of Adiraja, in the district of Aya
26. Cavernous lava, from the discharge of the river Adi-rojo near the village Sawangan.
27. Lava separating into Rhomboidal fragments, from the foot of the hill Bedagangan, opposite to the village of Adi-raja, found at the banks of the river.

28. Volcanic tufa, Padas of the Javanese, from Suko-rojo.
29. Volcanic tufa from Purwo-kerto.
30. Lavas from the basin of the river Banjaran, arising from the foot of the mountain of Tagal.
31. Lavas from the river Lo-Gowok, arising from the same mountain.
32. Lavas from the river Datar naer Ajibarang.
33. Lavas from the declivity south of Ajibarang, and from various other situations in the neighbourhood of that village.
34. Stone of watery deposition, from a hill south-west of Ajibarang, near the banks of the river Tiajum.
35. Varieties of stone of watery deposition from the same place (No. 34.) in lamellae, nodules, tables, &c. &c.
36. Sand-stone from the same place.
37. Rock from the banks of the river Tiajum (resembling Amygdaloid) near Ajibarang.
38. Lavas from the road towards Bojong-Tongo, in the district Probolingo.
39. Varieties of Tufa, from the river Kelawing near Probolingo.
40. Various siliceous stones out of the same.
41. Tufa from Kumutuk.
42. Compact lava from the same place.
43. Variegated stones, found among the pebbles in the bed of the river Serayu near Banjar.
44. Rounded volcanic pebbles, from the same place.
45 Fragments of aggregate rock, from the banks of the river at the same place (No. 44.)
46. Fragments from the large piles composing Gunung Lawet, consisting of tabular, &c. Basaltes.

47. Sand-stone from the foot of the same (see No. 49.)
48. Stones of watery deposition, from the foot of the hill Pawinian, on the route from Banjar to Pagger-pella.
49. Reddish Sand-stone from the same.
50. Basaltes in a state of decomposition, from the Northern declivity of the eminence of Pagger-pella, on the road towards Karang Kobar.
51. Varieties of original Basaltes from the same.
52. Lava from the basin of the river Kali-urang near Pagger-pella (vesicular, belonging to the lavas of later eruptions.)
52*b*.) Submarine lava from the same place (No. 52.)
53. Compact clay in tables, with angles rounded by attrition, from the same place.
53*b*.) Stone consisting apparently of petrified wood with sparry depositions.
54. Compact Pudding-stone (Amygdaloid) from the same (No. 52.)
55. Varieties of Sandstone from the same (No. 52.) fragments in thin lamellae, close and rectilinear, or concave—(apparently portions of spherical masses.)
56. Stones of watery deposition, from an eminence east of Karang-kobar.
57. Stones of watery deposition, found in extensive vertical strata at Kali lunyar.
58. Basaltes in a state of partial decomposition, from the section of an eminence on the near Kali-lunyar.
59. Stones of watery deposition, taken from an eminence between Kali-lunyar and Nusupan.
60. Basaltes in a state of partial decomposition

from an eminence eastward of Nusupan, on the road towards Batur.

61. Basaltes found near Batur.

62.

63.

64.

65. Varieties of lava found near Batur.

66. Partially decomposed Pudding-stone, from the road towards the hill Pakerman.

67. Partially decomposed Basaltes, from the mountain Ptarangan, near Batur.

68. Reddish lava, on the road from Batur to Koning.

69. Basaltes from the rivulet (Kali-Iring) near the village Kali-Bebber.

70. Fragment of an artificial stair, on the descent of the mountain Telogo-jebong or Prow.

71. Varieties of lava, from the foot of the mountain Sundoro, near the village of Kali-Bebber.

72. Varieties of lave from the same place (No. 71.) taken on the road between Kali-bebber and Kerteg.

73. Varieties of lava found on the road between Kerteg and Rejo.

74. Volcanic Tufa between Kali-bebber and Kerteg.

75. Basaltic rock, separating spontaneously in tables, from the tract between Jittis and Pakkis-wiring.

76. Lava from the environs of mount Sumbing found near Pakkis-wiring.

77. Basaltic-stone in a state of incipient decompositioin, the surface being friable and earthy, from a hill on the route between Pakkis-wiring and Kamantran.

SECTION IV.

Catalogue of the Plants observed during the preceding Tour.

Class I. *Monandria.*

Phrynium dichotomum Roxbgh. Scitam pl. As Res. vol. XI. [Willd Thalia cannæformis	Bamban, of the *Javanese*
Phrynium capitatum	Angrik or Pattal
Amomum	Karawulu
Amomum	Teppus
Amomum	Unje-unje
Amomum	Wersa
Amomum	Unker-unkeran
Costus speciosus	Paching
Alpinia	Kapollan

Class II. *Diandria.*

Jasminum multiflorum	Poncho-sudo
Justicia Betonica	Loro-wudu [Adasadasan
Justicia	Mungsa, Kalamuksa, or
Justicia (see violacea	Juru-demmung
Justicia [Willd)	Gondorusso-kebo
Justicia	Kelumba
Justicia chinensis	Pinten
Justicia Gandarussa	Terus or Gondorusso
Justicia	Sukat-sawa
Justicia	Sambang-lema
Justicia	Teppu
Justicia Hyssopifolia	
Justicia	Native name not deter-
Justicia	ditto [mined.
Justicia	ditto
Piper Cubeba	Kumukus
Piper	Chabean

Genus doubtful		Patty-kulit or Barra
Genus doubtful	Sp. I.	Babad-kandel
Same Genus	Sp. II.	Ketopra
Same Genus	Sp. III.	Ke ji-warak or Brabas
Same Genus	Sp. IV.	Uwukwan
Same Genus	Sp. V.	Sido-toppo
Same Gunus	Sp. VI.	Native name not determined.
Same Genus	Sp. VII.	ditto

Class III. *Triandria.*

Valeriana	Kettul or Chumplongan
Genus doubtful	Komu-jingan
Genus doubtful	Nat. name not determined. (Herbary No. 772)

(Note—*The Grasses are omitted in this Catalogus.*

Class IV. *Tetrandria.*

Hedyotis *foetida m*	Simbu-an-lemma
Hedyotis	Attak
Ixora	Sikattan
Ixora *longifolia m*	Tomandellan
Callicurpa	Sangko
Cissus	Banyon
Belhamia	Bollang
Belhamia	Singkil
Plantago asiatica	Kuping-menyangan
Embothrium	Kendung
Embothrium	Krenyes
Gonocarpus	D renuan
Chloranthus inconspicuus	Kres-tulang
Genus doubtful	Api-api
Genus doubtful	Duduk-rayab
Genus doubtful	Putian or Gedean
Genes doubtful	Krema-gunung

Class V. *Pentandria.*

Heliotropium indicum	Ge-ja-an
Myosotis	Patra-wisa
Tournefortia	Angsang
Tournefortia	Simbu-an-kayu

Ophiorrhiza	Jokko-tuwo
Ophiorrhiza Mungos	Patty-Uler
Plumbago Rosea	Mud-ja
Convolvulus pellatus	Blaran
Convolvulus	Kang-kung-Kang-
Convolvulus	Pes-caprae [kung-an
Convolvulus nervosus	Native name not deter-
Convolvulus vitifolius	[mined
Convolvulus	Sampar-kidang
Campanula	Sukat-en-jari
Nauclea	Chautel-wessi
Nauclea	Kleppu
Scaevola Lobelie	Wudelan
Lobelia	Raggi-Jajar
Lobelia	Bawangan
Lobelia	
Coffea	Jambon
Morinda citrifolia [culta)	Wongkudu
Morin. (varietas citrifol-	
Mussaenda frondosa	Walli-kaddeb
Mirabilis Jalappa	Kembang-pukkul-ampat
Physalis	Chi-plu-an
Solanum	Ranti
Solanum verbascifolium	Tetter
Ardisia *littoralis m*	Lempennen
Ardisia	Lempenni
Ardisia	Walluk
Ardisia	
Cordia	Kendal-rambat
Cordia Myxa	Kendal
Tectona grandis	Jati
Rhamnus	Kandri
Rhamnus	Gondopuran, Kamalon
Rhamnus	Pepe-lout, Singkil-
Mangifera (var. indic.)	Po [rampat
Viola	Lenga-tangan
Impatiens cornuta	Pachar-banyu
Impatiens triflora	
Leea	Lengki, Kayu-bowaya
Leea sambucina	Tuwa

Leea acquata	
Vitis *stercoracea m*	Greng-gutu
Aegiceras majus	Truntung
Achyranthes	
Achyranthes sangvino-	
Celosia castrensis [lenta	
Rouwolfia	Plentru
Cerbera Manghas	Binteru
Tabernaemontana	Pule
Asclepias gigantea	Weduri
Apocynum frutescens	Raggi
Natural order contortæ Genus doubtful	Jombirit
ditto ditto	Oyod-kepitting
ditto ditto	Ri-bettu or Kelongkit
ditto ditto	Pottong-assu
ditto ditto	Tipis-kulit
Psychotria	Sekulan
Psychotria	Wattuk
Psychotria	
Psychotria	Native name not deter-
Psychotria	Kudon [mined
Hydrocotile asiatica	Pung-ga-gan Panigo-
Caucalis	[wong
Sambucus	Kettul
Basella	Kenchur
Mahernia	Wesnu
Polyscias	Gorang-irêng
Polyscias	Gorang-klanting
Polyscias	Chelangan, Tanganan
Polyscias	Oyod-tangan
Polyscias	Puchangan
Polyscias	Sanhang, Pampung
Polyscias	Gigil, Gabusan
Genus doubtful	Tembessen, Bimossetti
Genus doubtful	Telos-kepollo
Genus doubtful	Bangkong, Tempo-
Genus doubtful	Duduk-agung [wiyung
Genun doubtful Sp. I.	Delu-alas
Same Genus Sp. II.	Tiba-buntil, Gemblek

Genus doubtful	Jalen
Genus doubtful	Gundo, Gudean
Genus doubtful	Mandillan, Gambiran
Genus doubtful	Gorang-pute
Genus doubtful (Mangi-	Ingas, Rengas
Genus doubtful [fera)	Kemiri-seppet
Same Genus	Pen-jalinan
Same Genus	Kayu-sapi
Genus doubtful	Sekkar-Jalla, Mallattan
Genus doubtful	Jeruan, Ri-kuwut
Genus doubtful	Dukut-Serru
Genus doubtful	Native name not deter-
Genus doubtful Sp. I.	[mined
Same Genus Sp. II.	
Genus doubtful	Sala-Nyowo (Sp. II.)
Genus doubtful	
Genus doubtful	Kayu-tyu, Itil-biru
Genus doubtful	Sekulan, Kiput.

Class VI. *Hexandria.*

Trandescantia	Patungan
Crinum asiaticum	Bakung
Curculigo	Nyangko
Dracaena ensifolia Lin; } Dianella nemorosa La- [mark }	Tog-gare
Tacca pinnatifolia	Urean
Calamus Rottang	Rottan-mas } Rottan-cha- [ching } with many other varieties
Bambusa	Pring—many varieties
Genus doubtful	Lompongan
Genus doubtful	Oger-oger

Class VII. *Heptandria.*

Jonesia.	Belanak

Class VIII. *Octandria*

Allophylus	Klayu
Clausena [Ind)	Kayu-toun, Kemuneng-[kodok
Clausena excavata (Burm:	Tikussan

Dodonaea	Kesse
Xylocarpus Granatum	Nyeri, Jombo
Schmiedelia racemosa	Chukilan
Schmiedelia	Badot
Polygonum	Barang
Polygonum chinense	
Polygonum orientale	
Polygonum barbatum	
Polygonum	Tebonnan
Genus doubtful	Wallerlar, Kayu-antang
Genus doubtful	Bolo-dowo, Dondang
Genus doubtful	Endog-endogan.

Class IX. *Enneandria.*

Laurus	Kayu-jey or Nyampu-[gedobog
Laurus	Krangeang
Laurus	Pachol
Laurus	Teja
Laurus	Wuru
Laurus	Wuru-kunyit
Laurus	
Cassyta filiformis	Sukat-kremi

Class X. *Decandria.*

Cassia obtusifolia	Keteppeng
Cassia alata	Keteppeng-kebo
Cassia	Wringinan
Guilandina	Wewe
Gaertnera racemosa	Kakkas
b.,-a variety with winding stem:	Kakkas-rambat.
Cynometra ramiflora	Keppel
Cynometra	Ipil
Adenanthera	Saga-kebo
Limonia	
Sandoricum indicum	Sentul
Sandoricum	Keddayu
Melastoma malabathrica	Seng-gani
Melastoma speciosa *m*	
Melastoma	Tembagan
Melastoma	

Melastoma	Pari-jotto
Casearia	Balung
Arbutus	Manis-rejo
Arbutus	Girmot, Rangutan
Arbutus	Kembang-Kepitting.
Andromeda	Pruwoko, Pruwosote, Gumen
Dais octandra	Siri-jawan, Lawe
Cerastium	Bro-jo-lintan
Oxalis corniculata	Somang-gi
Robergia	Popouwan
Spondias	Rou
Banisteria	Re-mas
Genus doubtful	Ares, Kayu-gedang
Genus doubtful	Jirekan, Klimo-kouchir
Genus doubtful	Ri-Kengkeng
Genus doubtful	Ampet, Sing-ganen

Class XI. *Dodekandria.*

Bassia	Kommit
Rhizophora	Bakko
Rhizophora	Tanchang
Triumfetta	
Kleinhofia hospita	Timoho
Sterculia Balanghas	Antap Kayu-lumut
Sterculia foetida	Keppo-jangkang
Sterculia	Dok-dokkan
Serculia	Chu-chuk-urang

Class XII. *Icosandria.*

Psidium pyriferum	Jambu-klutu
Engenia racemosa	Putat
b. Variety	Putat-tresse
Engenia	Song-gom, Bedér
Engenia	Telampok
Engenia	Jambon
Engenia	Glunden, Besole
Engenia	Gowok, Klessem
Sonneratia acida	Bogem
Sonneratia (variety of the preceding) - - -	Prapat

Sesuvium portulacast-	Krokot, Gelang
Spiraca [rum	Wari-gunung
Rubus moluccanus	Brembetc
Rubus parvifolius	Uchi-uchi
Rubus	Grung-gung
Fragaria	Saprahan

Class XIII. *Polyandria.*

Calophyllum Inophyl-	Nyamplung
Elaeocarpus serrata [lum	Jenitri
Microcos paniculata	Delluwak
Alangium hexapetalum	Komlentoro
Uvaria *florida m*	Kalak
Uvaria	Native name not deter-
Uvaria	Kalak-prit [mined
Uvaria	Chempoko-baros
Annona	Chellalak
Dillenia	Sempu
Dillenia	Gregel
Ranunculus	Mas-massas
Genus doubtful Sp. I	Umbel-umbellan
Same Genus Sp. II	Umbel-umbelan-kebo
Same Genus Sp. III	Umbel-umbellan-prit
Same Genus Sp. IV	Umbel-umbelan-abang
Genus doubtful	Native name not deter-
Genus doubtful Sp. I	Wadang, Bayur [mined
Genus doubtful Sp. II	Walang
Genus doubtful	Jirak
Genus doubtful	Gobedan
Genus doubtful	Gudean, Sadang

Class XIV. *Didynamia.*

Mentha auricularia	
Leonurus	Kleng-leng-an
Betonica	Jung-gul
Stachys	Sangketan
Stachys	
Ballota disticha	Slangking
Scutellaria	
Ocymum	Sangket

Ocymum	Wrikki
Ocymum	Dillem
Mellitis	
Ruellia antipoda	Krok-nangsi
Ruellia Anagallis	Krok-lawok
Volcameria inermis	Gambir-lout
Volcameria serrata	Sri-gung-gu
Volcameria	M lati-alas, Lorunko
Clerodendrum	Trembuku
Thunbergia	Chuchuk-dandang
Vitex trifolia	Lagundi
Vitex	Ketlêng
Vitex	Laban
Vitex	Ampu
Bignonia	Kappal
Bignonia	Pichisan, Kapallan
Bignonia indica	Wungli
Acanthus illicifolius	Jeru-ju
Mimules	Kri-yak
Class XV.	*Tetradynamia.*
Sinapis sativus	Sawe
Cleome	Komandellan
Class XVI.	*Monadelphia.*
Bombax heptaphyllum	Randu agung
Sida retusa	Sidoguri
Urena lobata	pu uttan
Hibiscus Abelmoschus	Waron
Hibiscus Surattensis	Ri-larat, Usi-usi
Hibuscus	
Genus doubtful	Munung, Wining
Class XVII	*Diadelphia.*
Polygala *pendula m*	Native name not determined
Polygala	ditto ditto
Abrus precatorius	Saga
Crotalaria	Orrok-orrok
Crotalaria	
Erythrina Corallodendrum	Chang-kring
Erythrina	Dadap

Dolichos	Kesse
Galedupa arborea	Krand-ji
Galedupa (scandens)	Gaddel, Tower
Hedysarum (var. unbellat?)	Belanakkan
Hedysarum strobili-	Gattak
Hedysarum [ferum	Gudean
Hedysarum	
Hedysarum	
Lotus	Somang-gi-gunung

Class XVIII. *Polyadelphia.*

Dario Zebethinus	Duren
Munchausia speciosa-(*Lagerstroemia Reginæ*)-	Wungu
Hypericum	Unje-unje

Class XIX. *Syngenesia.*

Sonchus	Sumbrêng
Sonchus	Kayu Bono
Lactuca	Tespong
Bidens bipinnata	
Ethulia	Saprag
Eupatorium	Te-gunung (mollo
Artemisia	Rodo - mollo, Godo-
Gnaphalium	Sendiru
Gnaphalium	
Conyza	Sembung
Conyza	Trassen
Senecio	Tegel-kiyu
Aster	
Verbesina	Sruni
Verbesina biflora	Urang-aring
Verbesina	
Sphaeranthus globosus	
Genus Doubtful (Comp. Genus *Hubertia*)	Sembung (with arboreous stem)

Class XX. *Gynandria.*

Orchis	Native name not deter-
Stilago Bunius	Wuni [mined

Epidendrum pyramidatum *m* --- ---Bawangan
Epidendrum (Herbario No. 766)
Epidendrum (Herbario No. 767)
Epidendrum (Herbario No. 765)
Epidendrum (Herbario No. 764)
Epidendrum (Herbario No. 765)
Epidendrum (Herbario No. 763)

Class XXI. *Monoecia.*

Artocarpus incisa	Sukkon
Artocarpus	Purut
Artocarpus	Bendo
Casuarina	Chomoro
Hernandia sonora	Kemiren
Urtica longifolia	Lunyar
Urtica	Jurang
Urtica	Jurang-rambat
Urtica	Menchogan
Urtica candicans	Ramen
Urtica	Sumpel-wuwu
Urtica aestuans	Kemadu
Urtica	Native name not determined
Amaranthus	Bayem
Epibatherium	Suru
Arum	Banga
Arum	Dadag, Slempat
Arum	Klatta
Arum	Nampu
Begonia	Trembilungan
Caryota urens	Kendiru, umbu-enduru
Fagus	Sarangan
Quercus	Passang
Areca	Jambi Pi-ji
Phyllanthus urinaria	
Phyllanthus	Mer, Immer, Tomtoman
Phyllanthus	Katu-kebo
Phyllanthus	Dèmpul
Croton	Blo-ketupu
Croton	Kepét, Sawagi

Croton	Merangan
Croton variegatum	
Croton	Tutub ka-jang
Croton *coccineum m*	
Ricinus Mappa	Tutub-anchur
Ricinus	Tutub-awu
Jatropha curcas	Jarak pagger
Aleuritis triloba	Kemiri
Gnetum (E: volubilis)	Tangkil
Momordica Luffa	Ojong, Gembas
Bryonia *foetida m*	
Natural order *Cucurbitaceae*. Genus doubtful	Bolu-paït
Ditto ditto	Bolu-tekkék
Ditto ditto	Sirahan
Ditto ditto	Laron
Genus doubtful	Krembi
Genus doubtful	Kanchilan
Genus doubtful (among the Palmae	Gligen, Mendu
Genus doubtful do. do.	Wergo
Genus doubtful do. do.	Aren

Class XXII. *Dioedia.*

Pandanus littoralis	Pandan Passir
Pandanus	Soge-mane
Cycas revoluta	Pakis ta-ji
Excaecaria Agallocha	Kayu-Gitta
Brucea	Patty-lallar
Antidesma	Andi-andi
Antidesma	Andi-andi-an
Smilax China	Ri-wonno
Smilax (caule inerme)	Godong-wonno
Flacourtia	Rukkem
Flacourtia	Native name not determined
Nepenthes distillatoria	Kalok-chikko
Myristica	Kayu-ra
Sutherlandia littoralis	Dungun
Genus doubtful	Kallas, Gesto
Genus doubtful	Suru-kebo

Genus doubtful	Pu-chung [guyu
Genus doubtful	Tembaga, Teng-gulung-
Genus doubtful	Serrut

Class XXIII. *Polygamia.*

Parietaria	Derrês
Celtis orientalis	Angrung
Terminalia	Ketappan
Mimosa	Bangkong
Mimosa	Jengkol
Mimosa	Goleng
Mimosa	Kedawung
Mimosa	Komlandingan
Mimosa	Pette
Mimosa	Šengon
Mimosa	Seppat
Mimosa	Tekkik
Mimosa	Werru, Wangkal
Ficus	Awar-awar
Ficus	Bulu
Ficus	Bulu-empan
Ficus	Gondang
Ficus	Karet
Ficus	Konyal
Ficus	Kebbêk
Ficus	Lo
Ficus	Luwing
Ficus	Rempelas
Ficus	Weringin
Ficus (variety of the pre-	Pang-gang
Ficus [ceding)	Randan
Ficus	Wiloddo
Ficus	Se-pre
Ficus	Pellus

Class XXIV. *Cryptogamia.*

Ord: II. Filices or Ferns

Ophioglossum (see Hydroglossum willd) Her- [bario No. 706

Acrostichum	Herbario	No.	662
Acrostichum	ditto	No.	754
Acrostichum	ditto	No.	829
Pteris	ditto	No.	672
Pteris	ditto	No.	733
Pteris	ditto	No.	762
Pteris	ditto	No.	819
Pteris -	ditto	No.	976
Blechnum	ditto	No.	634
Blechnum	ditto	No.	735
Blechnum	ditto	No.	753
Blechnum	ditto	No.	820
Blechnum	ditto	No.	821
Blechnum	ditto	No.	833
Hemionitis	ditto	No.	740
Hemionitis	ditto	No.	745
Hemionitis	ditto	No.	752
Meniscium	ditto	No.	653
Meniscium	ditto	No.	760
Meniscium	ditto	No.	818
Asplenium	ditto	No.	674
Asplenium	ditto	No.	688
Asplenium	ditto	No.	738
Asplenium	ditto	No.	751
Asplenium	ditto	No.	822
Asplenium	ditto	No.	824
Asplenium	ditto	No.	825
Asplenium	ditto	No.	826
Asplenium	ditto	No.	827
Davallia	ditto	No.	834
Davallia	ditto	No.	855
Davallia	ditto	No.	856
Polypodium	ditto	No.	673
Polypodium	ditto	No	734
Polypodium	ditto	No.	739
Polypodium	ditto	No.	743
Polypodium	ditto	No.	744
Polypodium	ditto	No.	745
Polypodium	ditto	No.	757
Polypodium	ditto	No.	761

Polypodium	Herbario	No. 835
Polypodium	ditto	No. 836
Polypodium	ditto	No. 837
Polypodium	ditto	No. 838
Polypodium	ditto	No. 839
Polypodium	ditto	No. 840
Polypodium	ditto	No. 841
Polypodium	ditto	No. 842
Polypodium	ditto	No. 843
Polypodium	ditto	No. 844
Polypodium	ditto	No. 845
Polypodium	ditto	No. 846
Polypodium	ditto	No. 847
Polypodium	ditto	No. 848
Polypodium	ditto	No. 849
Polypodium	ditto	No. 850
Polypodium	ditto	No. 866
Polypodium	ditto	No. 867
Polypodium	ditto	No. 868
Polypodium	ditto	No. 869
Polypodium	ditto	No. 870
Polypodium	ditto	No. 871
Polypodium	ditto	No. 872
Polypodium	ditto	No. 873
Adianthum	ditto	No. 756
Adianthum	ditto	No. 759
Adianthum	ditto	No. 830
Adianthum	ditto	No. 831
Lonchitis	ditto	No. 741
Lonchitis	ditto	No. 742
Scolopendrium	ditto	No. 828
Trichomanes	ditto	No. 747
Trichomanes	ditto	No. 749
Trichomanes	ditto	No. 750
Trichomanes	ditto	No. 755
Trichomanes	ditto	No. 832

3 Genera related to the Ferns.

Lycopodium	Herbario	No. 737
Lycopodium	ditto	No. 817

Lycopodium	ditto	No. 851
Lycopodium	ditto	No. 852
Lycopodium	ditto	No. 853
Lycopodium	ditto	No. 854
Lycopodium	ditto	No. 865

Order III *Musci-Mosses.*

Genus not determined	Herbario	No. 857
Dittc	ditto	No. 858
Ditto	ditto	No. 859
Ditto	ditto	No. 860
Ditto	ditto	No. 861
Ditto	ditto	No. 862
Ditto	ditto	No. 864.